



2005 STANDARD DRAWINGS

Part 2

<http://www.udot.utah.gov/index.php/m=c/tid=1091>

Change 8, Issued December 18, 2006

Because of file size the 2005 Standard Drawings have been split into six files. The contents of each part are listed below.

Part 1

Index

Sheets 1B and 1C

AT Series Drawings

BA Series Drawings

Part 2

CB Series Drawings

CC Series Drawings

DB Series Drawings

Part 3

DD Series Drawings

DG Series Drawings

EN Series Drawings

Part 4

FG Series Drawings

GF Series Drawings

GW Series Drawings

Part 5

PV Series Drawings

SL Series Drawings

SN Series Drawings

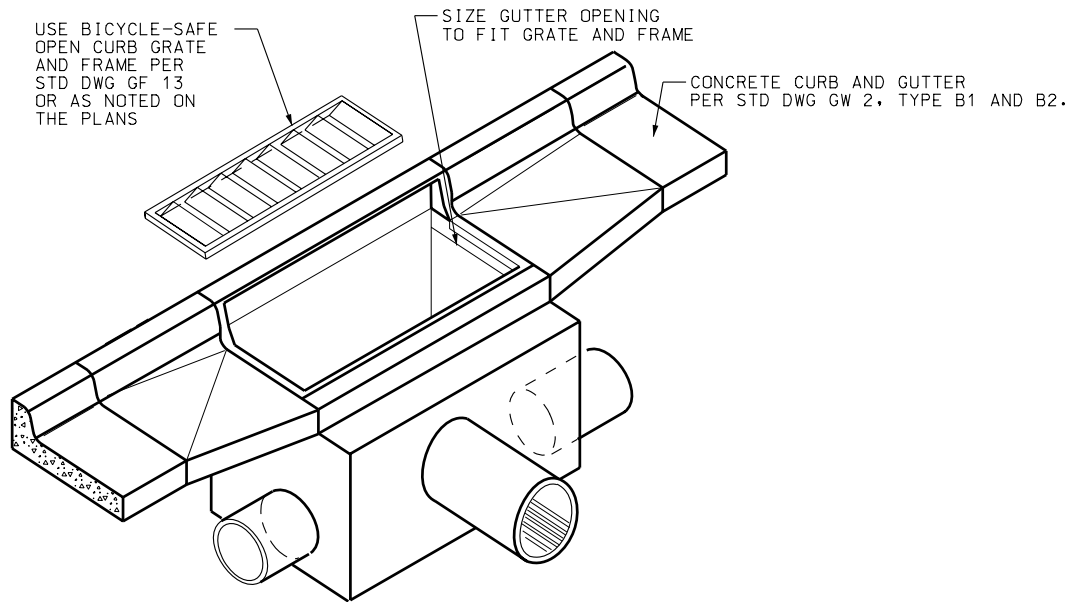
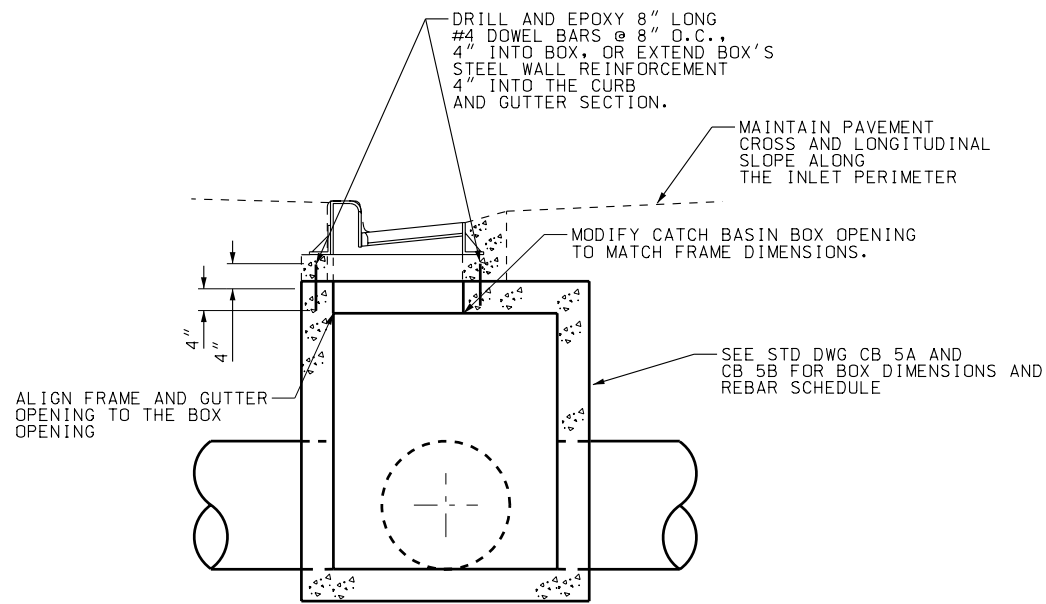
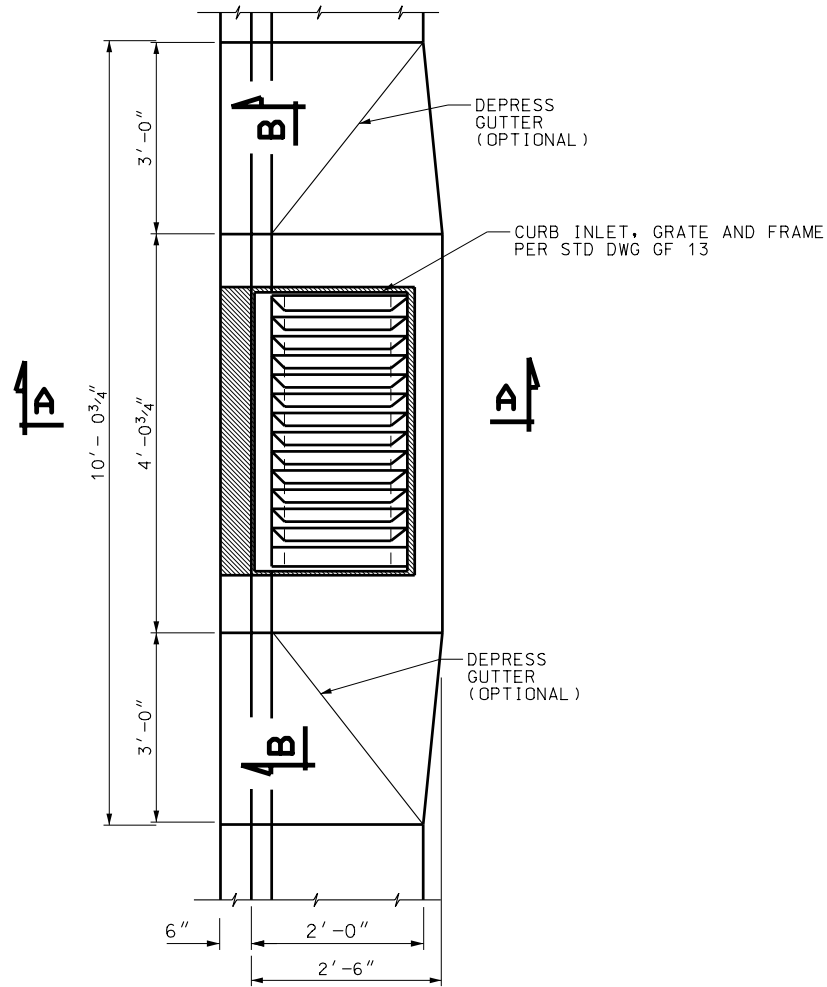
Part 6

ST Series Drawings

SW Series Drawings

TC Series Drawings

10-MAY-2005 DGN File: L:\Standard Drawings\Imperial\2005\Approved\Change2\Approved\cb2.dgn



ISOMETRIC VIEW

NOTES:

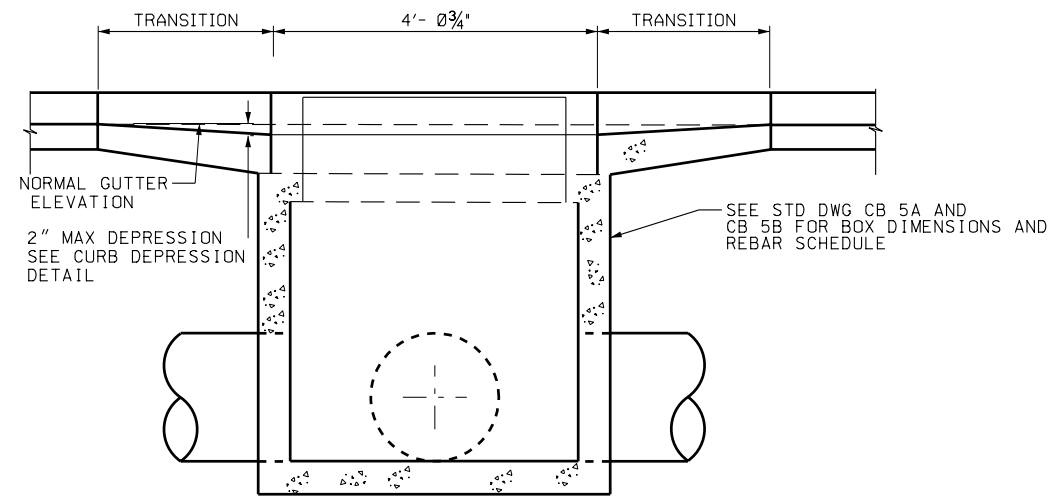
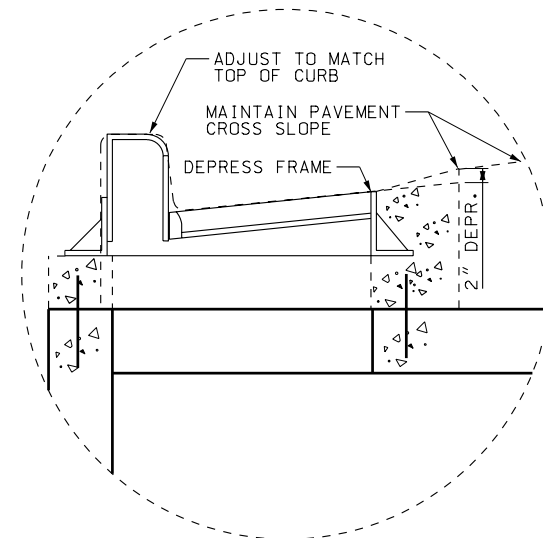
1. USE CLASS AA(AE) CONCRETE.
2. TYPE II CEMENT (LOW ALKALI) REQUIRED.
3. FOR NUMBER, LOCATION, AND SIZE OF PIPE(S) SEE ROADWAY PLANS.
4. SEE PLANS FOR DEPRESSION DIMENSION.
5. PROVIDE 3/4" CHAMFER ON ALL EXPOSED CONCRETE CORNERS.
6. FOR GRATE AND FRAME SEE STD DWG GF 13.

DESIGN DATA

HS 20 OR INTERSTATE ALTERNATE LOADING IN ACCORDANCE WITH AASHTO 17th EDITION SPECIFICATIONS.

STRUCTURAL STEEL: $F_y = 36,000$ psi

STRUCTURAL CONCRETE: $f'_c = 4,000$ psi
 $f_y = 60,000$ psi
 $n = 8$



SECTION B-B

REVISIONS		NO.	DATE	APPR.	REMARKS
1	04/28/05	M.F.			WIDTH OF BOX IN SECTION B-B MODIFIED SO DIMENSION LINES ARE CLEARLY SHOWN.

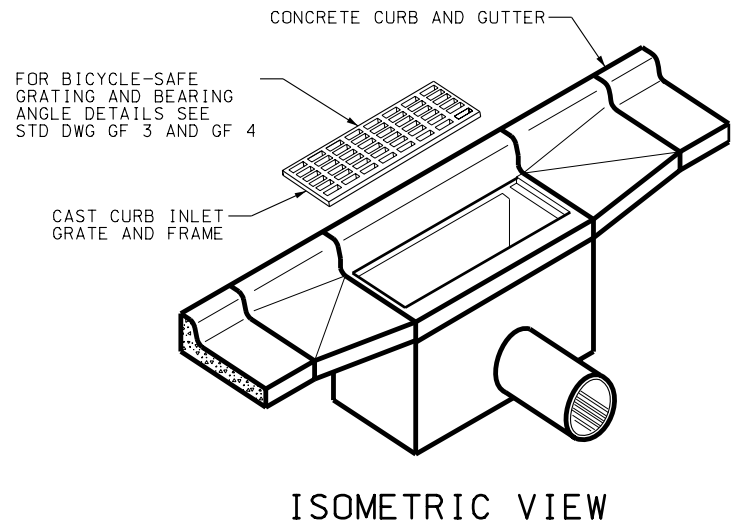
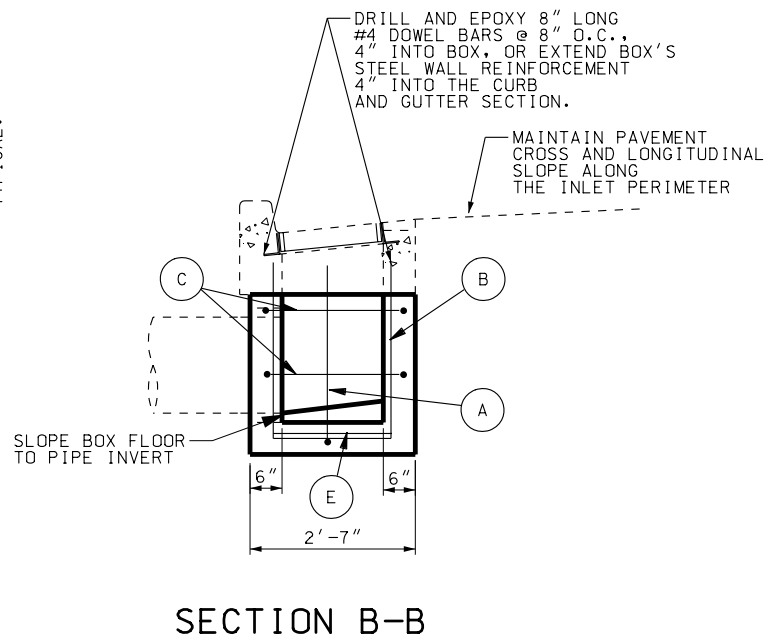
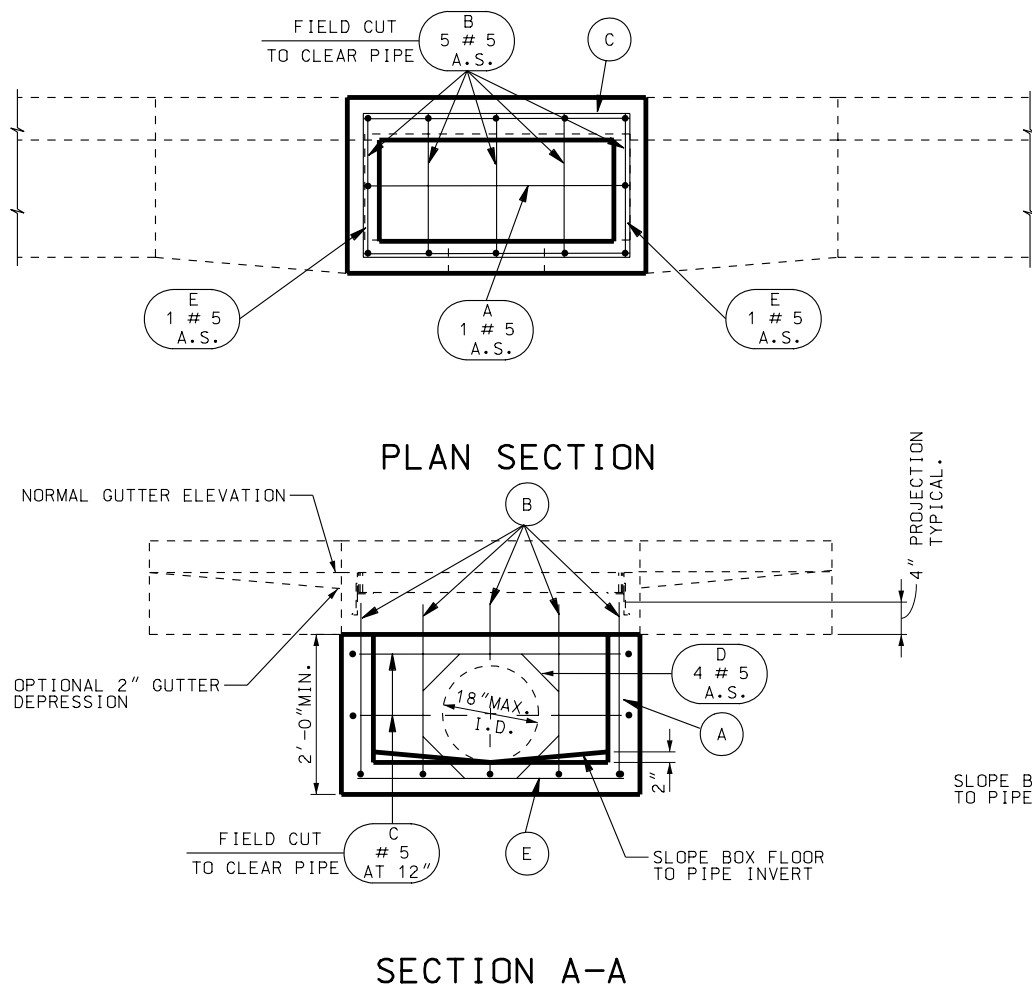
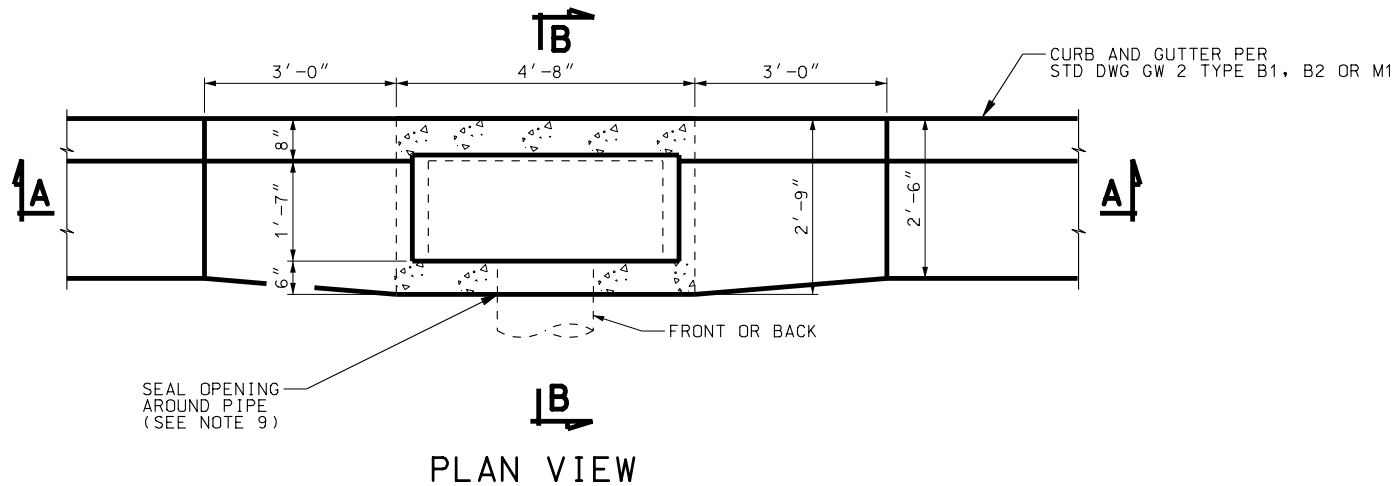
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

RECOMMENDED FOR APPROVAL
SALESMAN
APR. 28, 2005
DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR
DATE

OPEN CURB INLET

STD DWG
CB 2

DGN File: L:\Standard Drawings\Internal\2005\Approved\Change2\Approved\cb3.dgn
10-MAY-2005



NOTES:

1. USE COATED DEFORMED BILLET REINFORCING STEEL BARS CONFORMING TO AASHTO M 284 OR M 111 AND M 31 GRADE 60 RESPECTIVELY.
2. USE CLASS AA(AE) CONCRETE.
3. USE TYPE II CEMENT (LOW ALKALI).
4. PROVIDE $\frac{3}{4}$ " CHAMFER ON ALL EXPOSED CONCRETE CORNERS.
5. PROVIDE 2" CONCRETE COVER TO REINFORCING STEEL.
6. FOR GRATE AND FRAME SEE STD DWG GF 3 AND GF 4.
7. FIELD CUT AND BEND REINFORCING STEEL AS NECESSARY TO CLEAR PIPE(S) AND MAINTAIN 2" COVER.
8. FOR LOCATION AND SIZE OF PIPE(S) SEE ROADWAY PLANS.
9. CENTER PIPE IN BOX OPENING, USE NON-SHRINK GROUT TO SEAL OPENING AROUND THE PIPE, OR USE PIPE MANUFACTURER PIPE-BOOT INSTEAD.
10. SIZE BOX HEIGHT TO MEET MINIMUM COVER FOR PIPE USED. (SEE STD DWG DG 4)
11. REPAIR ANY DAMAGE OR CUTS TO EPOXY COATING.

DESIGN DATA

HS 20 OR INTERSTATE ALTERNATE LOADING IN ACCORDANCE WITH AASHTO 17th EDITION SPECIFICATIONS.

STRUCTURAL STEEL: $F_y = 36,000$ psi

STRUCTURAL CONCRETE: $f'_c = 4,000$ psi
 $f_y = 60,000$ psi
 $n = 8$

REINFORCING STEEL LAYOUT				
PROVIDE 2" MIN. COVER TO ALL BARS				
BAR A	BAR B	BAR C	BAR D	BAR E

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

SHALLOW
CATCH BASIN

STD DWG
CB 3

REVISIONS
1 04/28/05 M.F. SECTION B-B BACK WALL THICKNESS CHANGED FROM 8" TO 6".

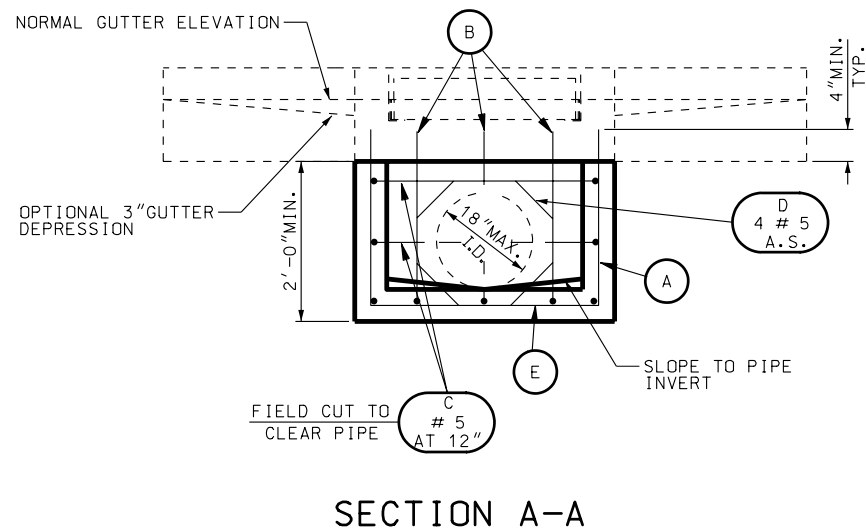
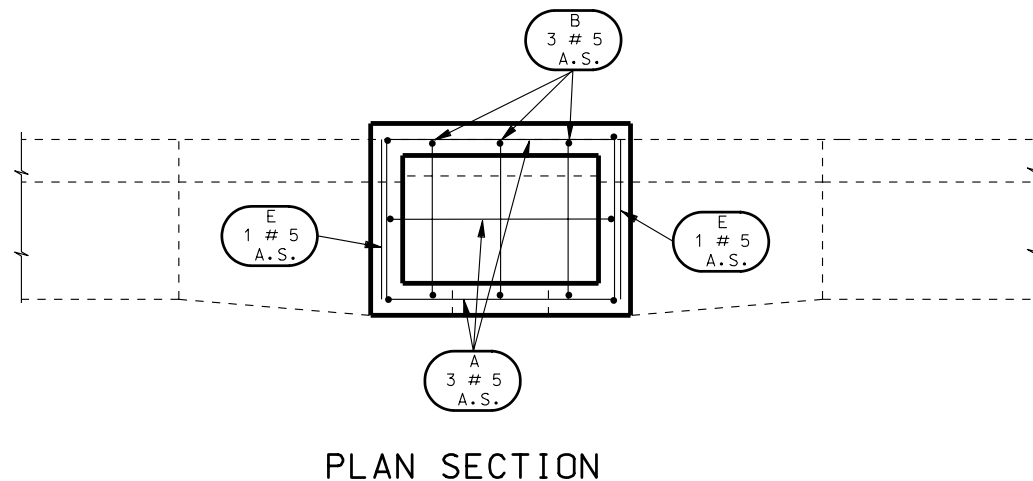
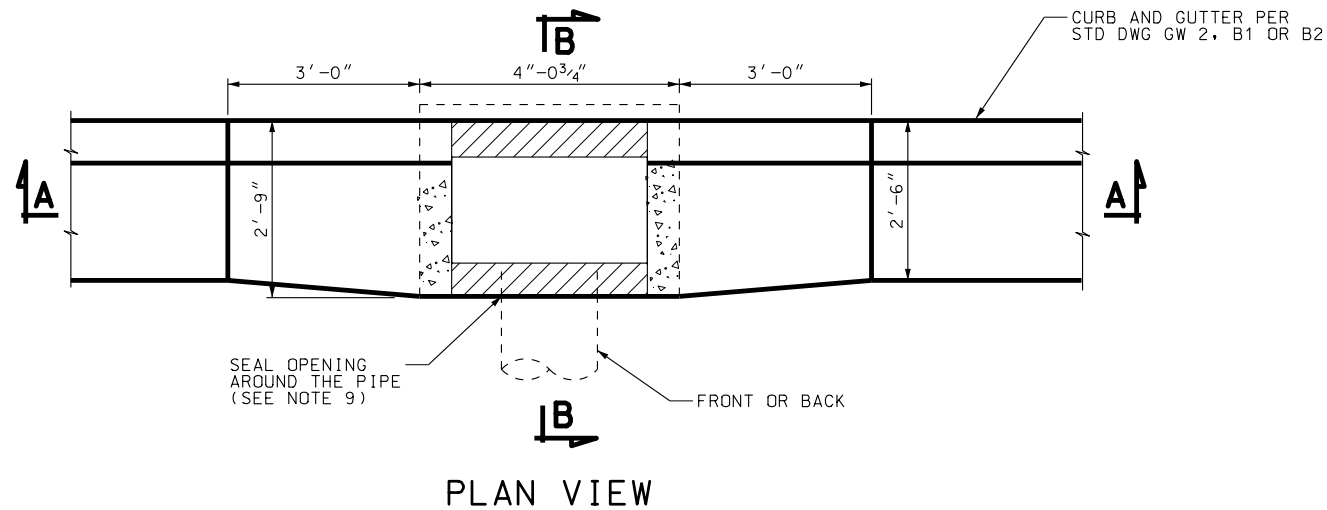
RECOMMENDED FOR APPROVAL
SALESMAN
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

DATE
APR. 28, 2005
DATE
APR. 28, 2005

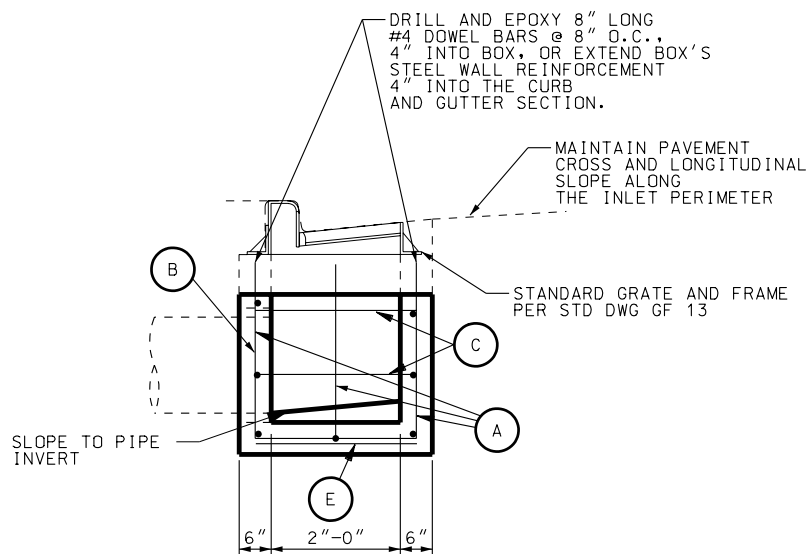
REMARKS

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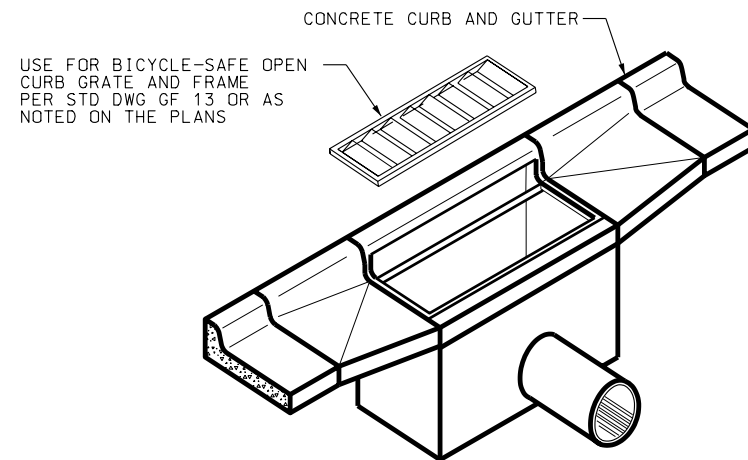
15-DEC-2004



SECTION A-A



SECTION B-B



ISOMETRIC VIEW

NOTES:

1. USE COATED DEFORMED BILLET REINFORCING STEEL BARS CONFORMING TO AASHTO M 284 OR M 111 AND M 31 GRADE 60 RESPECTIVELY.
2. USE CLASS AA(AE) CONCRETE.
3. USE TYPE II CEMENT (LOW ALKALI).
4. PROVIDE 3/4" CHAMFER ON ALL EXPOSED CONCRETE CORNERS.
5. PROVIDE 2" CONCRETE COVER TO REINFORCING STEEL.
6. FOR GRATE AND FRAME SEE STD DWG GF 13.
7. FIELD CUT AND BEND REINFORCING STEEL AS NECESSARY TO CLEAR PIPE(S) AND MAINTAIN 2" COVER.
8. FOR LOCATION AND SIZE OF PIPE(S) SEE ROADWAY PLANS.
9. CENTER PIPE IN OPENING, USE APPROVED NON-SHRINK GROUT TO SEAL OPENING AROUND THE PIPE, OR USE APPROVED PIPE MANUFACTURER PIPE-BOOT INSTEAD.
10. SIZE BOX HEIGHT TO MEET MINIMUM COVER FOR PIPE USED. (SEE STD DWG 4)
11. REPAIR ANY DAMAGE OR CUTS TO EPOXY COATING.

DESIGN DATA

HS 20 OR INTERSTATE ALTERNATE LOADING IN ACCORDANCE WITH AASHTO 17 TH EDITION SPECIFICATIONS.

STRUCTURAL STEEL: $F_y = 36,000$ psi

STRUCTURAL CONCRETE: $f'_c = 4,000$ psi
 $f_y = 60,000$ psi
 $n = 8$

REINFORCING STEEL LAYOUT

PROVIDE 2" MIN. COVER TO ALL BARS

BAR A	BAR B	BAR C	BAR D	BAR E

REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

OPEN CURB
SHALLOW CATCH BASIN

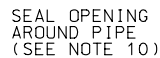
STD DWG
CB 4

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DATE
JAN 01 2005
DEPUTY DIRECTOR

REMARKS

NO. DATE APPR.

DATE



1. USE COATED DEFORMED BILLET REINFORCING STEEL BARS CONFORMING TO AASHTO M 284 OR M 111 AND M 31, GRADE 60 RESPECTIVELY.
2. USE TYPE II CEMENT (LOW ALKALI).
3. PROVIDE $\frac{3}{4}$ " CHAMFER ON ALL EXPOSED CONCRETE CORNERS EXCEPT WHERE NOTED OTHERWISE.
4. USE CONCRETE CLASS AA(AE).
5. PROVIDE MINIMUM 2" COVER FOR ALL REINFORCING STEEL.
6. FOR CURB AND GUTTER APPLICATIONS SEE STD DWG CB 1 AND CB 2 FOR BOX ELEVATIONS. INCLUDE CONCRETE QUANTITIES FOR CURB AND GUTTER IN ROADWAY QUANTITIES.
7. FOR MANHOLE STEPS SEE STD DWG GF 6.
8. USE 8" LONG, # 4 DOWEL BARS @ 8" O.C. MAX. OR EXTEND BOX REBARS 4" INTO THE CURB AND GUTTER, TO ATTACH CURB AND GUTTER TO THE BOX.
9. WHEN USING THE BOX AS AN INLET, SET EDGES OF THE BOX TO MATCH PAVEMENT FINISH GRADE AROUND BOX PERIMETER. SET TOP OF BOX SURFACE TO MATCH PAVEMENT CROSS AND LONGITUDINAL SLOPES. RESET ANY BOXES WHERE BOX SURFACE OR GRATE AND FRAME IS NOT FLUSH WITH PAVEMENT. DO NOT EXCEED $\frac{1}{4}$ " GRATE DEPRESSION.
10. CENTER PIPE IN BOX OPENING, USE NO-SHRINK GROUT TO SEAL OPENING AROUND THE PIPE, OR USE PIPE MANUFACTURER PIPE-BOOT INSTEAD.

HS 20 OR INTERSTATE ALTERNATE LOADING IN ACCORDANCE
WITH AASHTO 17th EDITION SPECIFICATIONS.

STRUCTURAL STEEL: $F_y = 36,000 \text{ psi}$
STRUCTURAL CONCRETE: $f'_c = 4,000 \text{ psi}$
 $f_y = 60,000 \text{ psi}$
 $n = 8$

(FOR DESIGN INFORMATION ONLY)

USE THE FOLLOWING EQUATIONS FOR CALCULATING
VOLUME OF CONCRETE AND WEIGHT OF STEEL:
(ENTER ALL DIMENSIONS IN FEET)

BOX WIDTHS OF 4' TO 8' & DEPTHS OF 4' TO 12'

$$\text{CONCRETE VOLUME (CU YDS)} = (0.037 * \text{WIDTH} + 0.1853) * \text{DEPTH} + (0.2161 * \text{WIDTH} - 0.2811)$$

TO CALCULATE VOLUME OF CONCRETE OF PIPE HOLES
VOLUME OF HOLES (CU YDS) = 0.0083 * (PIPE DIAMETER) - 0.0929

BOX WIDTHS OF 4' UP TO 8' & DEPTHS OF 4' TO 12'

$$\text{REBAR WEIGHT (LBS)} = (4.101 * \text{WIDTH} + 19.869) * \text{DEPTH} + (19.742 * \text{WIDTH} + 15.267)$$



CATCH BASIN / CLEANOUT BOX



GRATE AND FRAME APPLICATION

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SECTION 1000

STANDARD CATCH BASIN
AND CLEANOUT BOX

STD DWG
CB 5A

STANDARD DRAWING TITLE



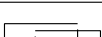



UTAH DEPARTMENT OF TRANSPORTATION STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION SAINT JARVIS TUNNEL, UAH	
RECOMMENDED FOR APPROVAL 	DATE JUN.30.2005
CHAIRMAN STANDARDS COMMITTEE APPROVED 	DATE JUN.30.2005
DEPUTY DIRECTOR	

[illegible]



1. PROVIDE FORMED INVERT AS SHOWN IN THE DETAIL ON THIS SHEET.
2. FIELD CUT AND BEND REINFORCING STEEL AS NECESSARY TO CLEAR PIPE(S) AND GRATE OPENINGS, AND MAINTAIN 2" COVER.
3. SEE STD DWG CB 5A FOR ALLOWABLE DIMENSIONS.
4. MAXIMUM PIPE DIMENSIONS ARE FOR PIPES PERPENDICULAR TO WALLS OF BOX, DETERMINE CLEARANCES FOR SKEWED PIPES.
5. FOR MANHOLE STEP DETAILS, SEE STD DWG GF 6.
6. ALL REINFORCING BARS TO BE #5 BARS @ 12" UNLESS OTHERWISE SHOWN.
7. EXTEND BARS A AND B INTO CURB AND GUTTER WHEN CASTING FOR CATCH BASIN ON STD DWG CB 1 AND CB 2.
8. REPAIR ANY DAMAGE OR CUTS TO EPOXY COATING.



REINFORCING STEEL LAYOUT					
PROVIDE 2" MIN. COVER TO ALL BARS					
BAR A	BAR B	BAR C	BAR D	BAR E	BAR F
					

[illegible]

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SHEET 1 OF 1

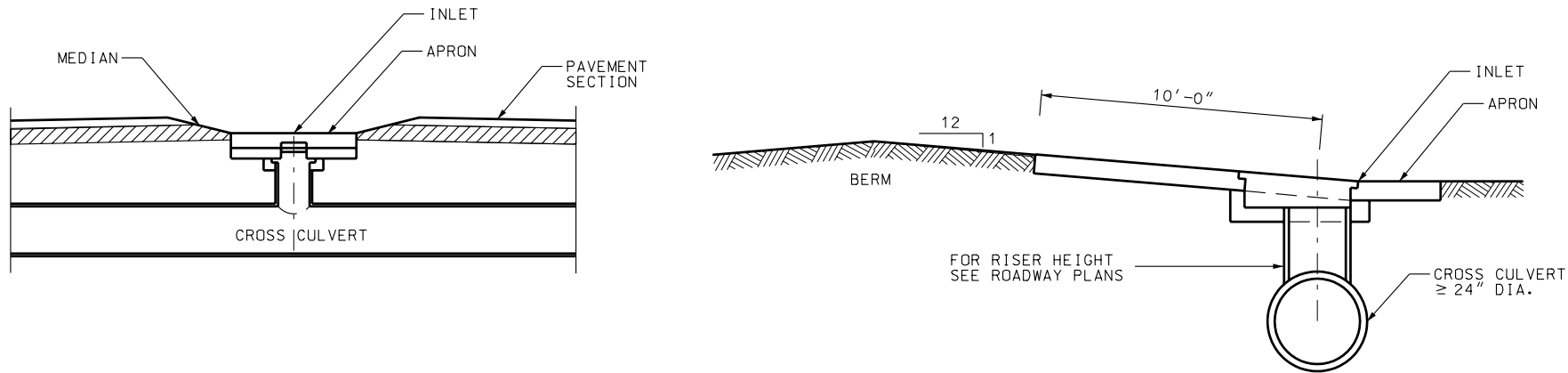
STANDARD CATCH BASIN AND CLEANOUT BOX SECTION

STD DWG
CB 5B

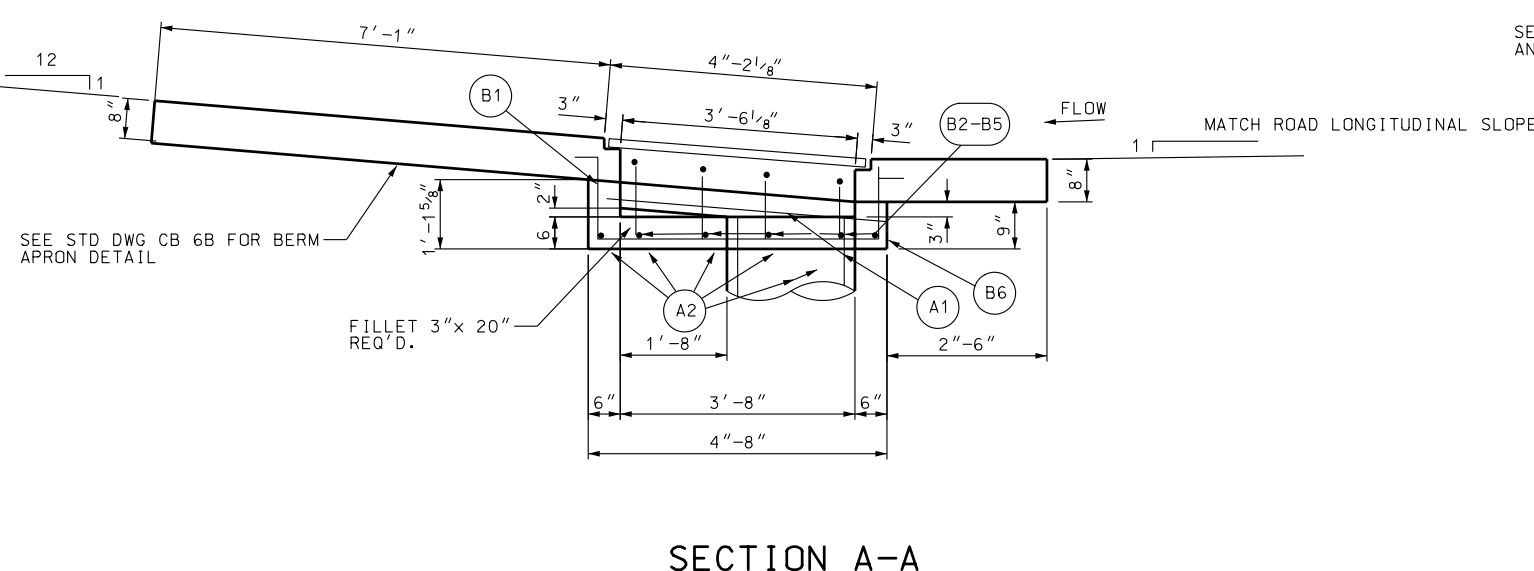
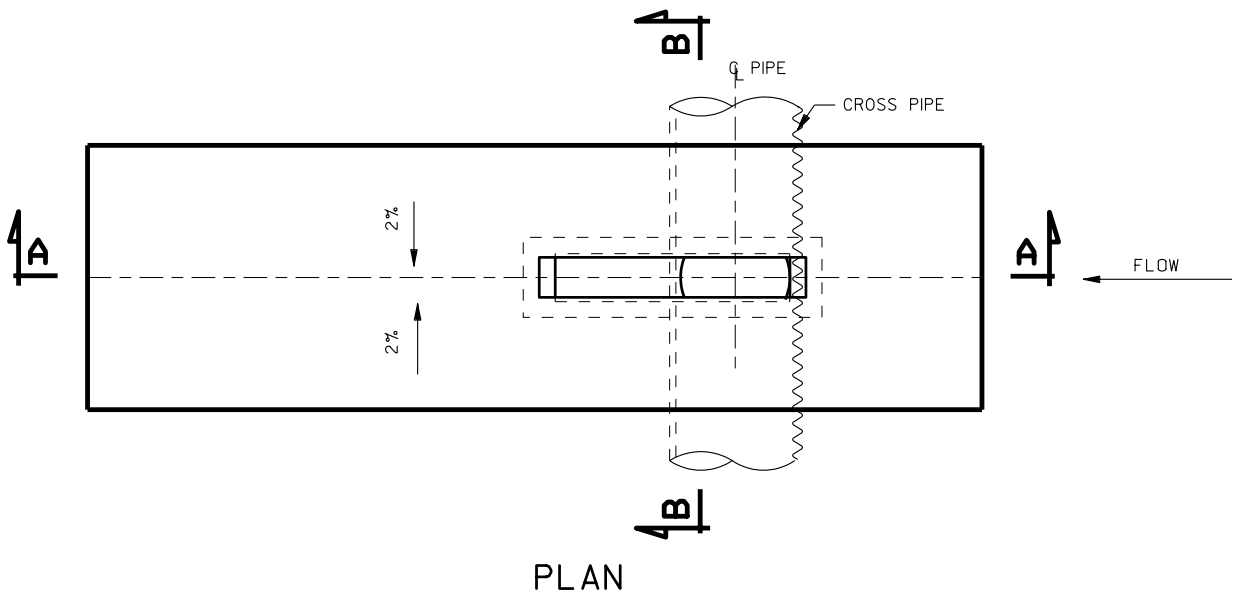
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CHAIRMAN, STANDARDS COMMITTEE		DATE
APPROVED	<i>[Signature]</i>	JAN 01, 2005
SECURITY DIRECTOR		DATE

STANDARD DRAWING TITLE

REMARKS



MEDIAN DROP INLET AND APRON SITUATION LAYOUT



NOTES

1. USE COATED BILLET REINFORCING STEEL BARS CONFORMING TO AASHTO M 284 OR M 111 AND M 31 GRADE 60 RESPECTIVELY.
2. USE 24" DIA. PIPE RISER UNLESS OTHERWISE SPECIFIED ON THE PLANS.
3. TYPE II CEMENT (LOW ALKALI) REQUIRED.
4. FOR GRATE AND FRAME SEE STD DWG GF 3.
5. CONSTRUCT A BERM AS PART OF DROP INLET. TYPE "B" DROP INLET ON STD DWG 7A AND 7B DOES NOT REQUIRE A BERM.
6. USE STRAIGHT #5 REBAR AT 18" ON CENTER, EXCEPT AS NOTED OTHERWISE. CUT AND FIELD BEND BARS WHERE NECESSARY TO CLEAR PIPES.
7. REPAIR ANY DAMAGE OR CUTS TO EPOXY COATING.

DESIGN DATA

HS 20 OR INTERSTATE ALTERNATE LOADING IN ACCORDANCE WITH AASHTO 17th EDITION SPECIFICATIONS.

STRUCTURAL STEEL: $F_y = 36,000$ psi

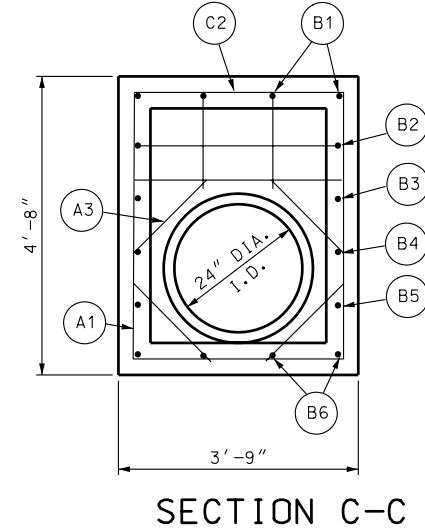
STRUCTURAL CONCRETE: $f'_c = 4,000$ psi
 $f_y = 60,000$ psi
 $n = 8$

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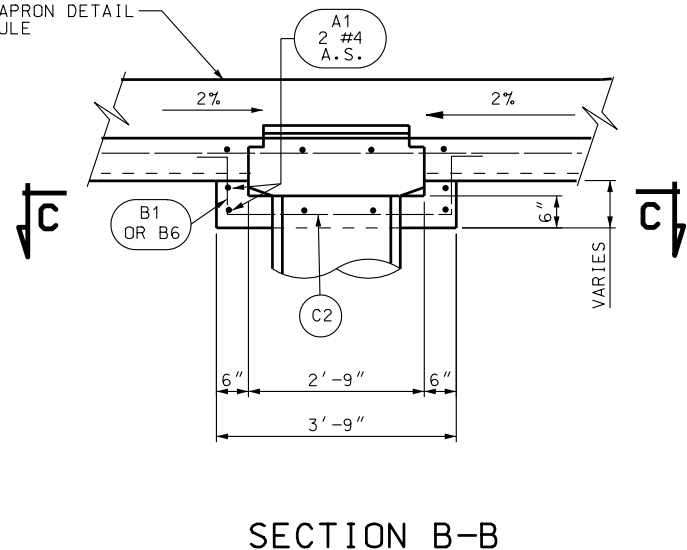
(SEE TABLES IN STANDARD DRAWING CB 6B)

APRON DETAIL:

(SEE STANDARD DRAWING CB 6B)



SEE STD DWG CB 6B FOR BERM APRON DETAIL AND REINFORCING STEEL SCHEDULE

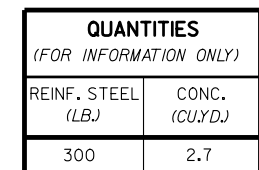
















UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

RECOMMENDED FOR APPROVAL
SALT LAKE COUNTY
JAN 01 2005
DATE
JAN 01 2005
DATE
DEPUTY DIRECTOR

DROP INLET TYPE "A"

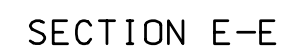
STD DWG
CB 6A



REINFORCING STEEL SCHEDULE																											
A1				A2				A3																			
SIZE				SIZE				SIZE																			
	NO.	LENGTH			NO.	LENGTH			NO.	LENGTH																	
4	4	4'-4"		4	5	2'-8"		4	4	1'-6"																	
B1				B2				B3			B4			B5			B6										
SIZE				SIZE				SIZE				SIZE				SIZE				SIZE							
	NO.	a			NO.	a			NO.	a			NO.	a			NO.	a			NO.	a					
4	4	1'-6"		4	2	1'-5"		4	2	1'-4"			4	2	1'-3"			4	2	1'-2"			4	4	1'-0"		
C1				C2																							
SIZE				SIZE																							
	NO.	LENGTH			NO.	LENGTH																					
4	12	7'-8"		5	6	3'-5"																					
D1				D2				D3																			
SIZE				SIZE				SIZE																			
	NO.	LENGTH			NO.	LENGTH			NO.	LENGTH																	
5	8	13'-8"		5	2	5'-5"		5	2	3'-8"																	

-

SECTION D-D

[illegible]

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

RECOMMENDED FOR APPROVAL: [Signature] SAINT LAKES COUNTY HIGH

CHAIRMAN STANDARDS COMMITTEE: [Signature] APPROVED: [Signature] DATE: JAN.01.2005

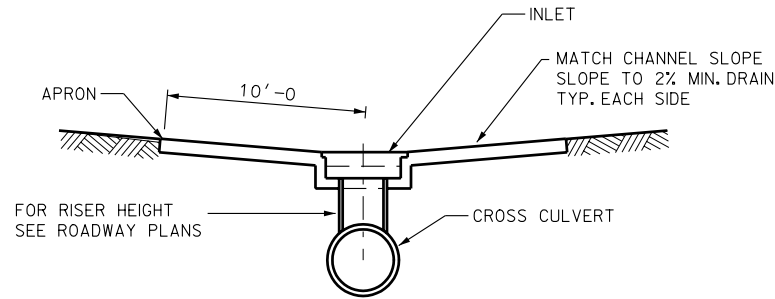
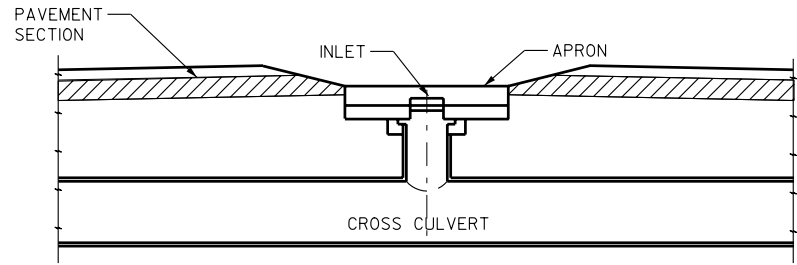
CHAIRMAN STANDARDS COMMITTEE: [Signature] APPROVED: [Signature] DATE: JAN.01.2005

BERM APRON
WITH DROP INLET
TYPE "A"

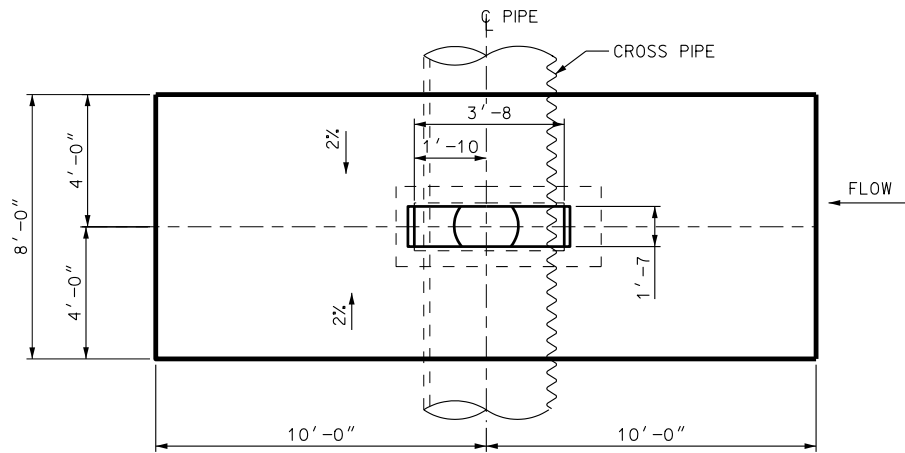
STANDARD DRAWING TITLE

STD DWG
CB 6B

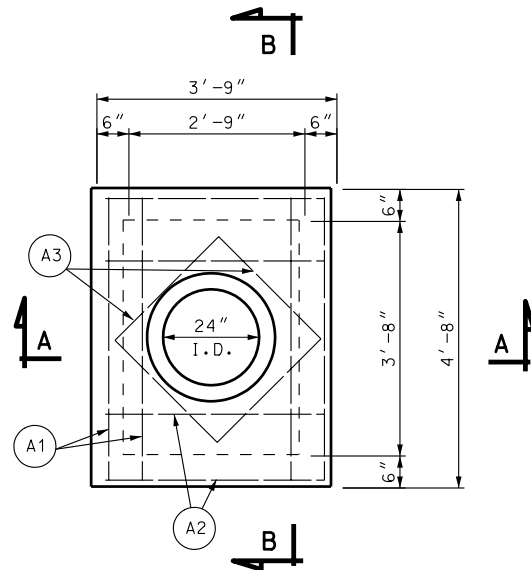
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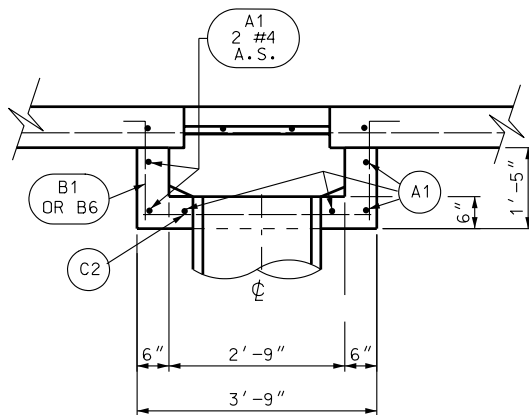
MEDIAN DROP INLET SITUATION LAYOUT



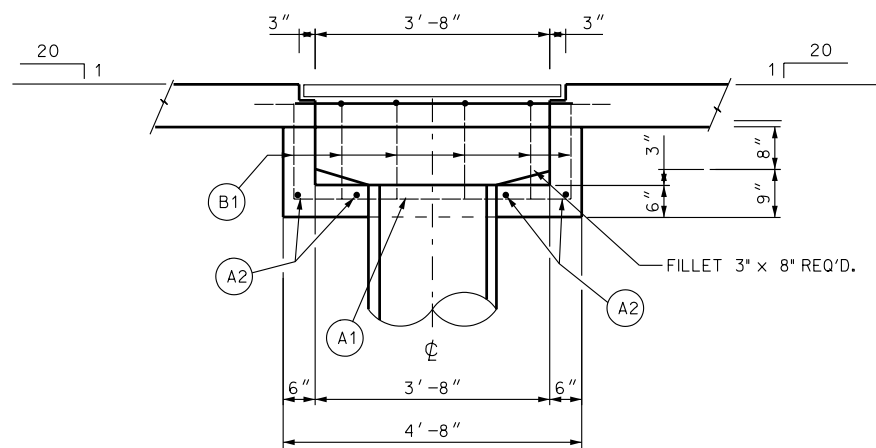
DROP INLET AND APRON LAYOUT PLAN



DROP INLET PLAN VIEW



SECTION B-B



SECTION A-A

NOTES

1. USE COATED DEFORMED BILLET STEEL BARS CONFORMING TO AASHTO M 284 OR M 111 AND M 31 GRADE 60 RESPECTIVELY.
2. USE 18" DIA. PIPE RISER UNLESS OTHERWISE SPECIFIED.
3. TYPE II CEMENT (LOW ALKALI) REQUIRED.
4. FOR GRATE AND FRAME SEE STD DWG GF 3.
5. USE STRAIGHT #5 REBAR AT 18" CENTERS EXCEPT AS NOTED OTHERWISE. CUT AND FIELD BEND BARS WHERE NECESSARY TO CLEAR PIPES.
6. REPAIR ANY DAMAGE OR CUTS TO EPOXY COATING.

DESIGN DATA

HS 20 OR INTERSTATE ALTERNATE LOADING IN ACCORDANCE WITH AASHTO 17th EDITION SPECIFICATIONS.

STRUCTURAL STEEL: $F_y = 36,000$ psi
STRUCTURAL CONCRETE: $f'_c = 4,000$ psi
 $f_y = 60,000$ psi
 $n = 8$

QUANTITIES

SEE TABLES ON STD DWG CB 7B

APRON

SEE STD DWG CB 7B

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR
JAN.01.2005
DATE
JAN.01.2005
DATE

DROP INLET TYPE "B"

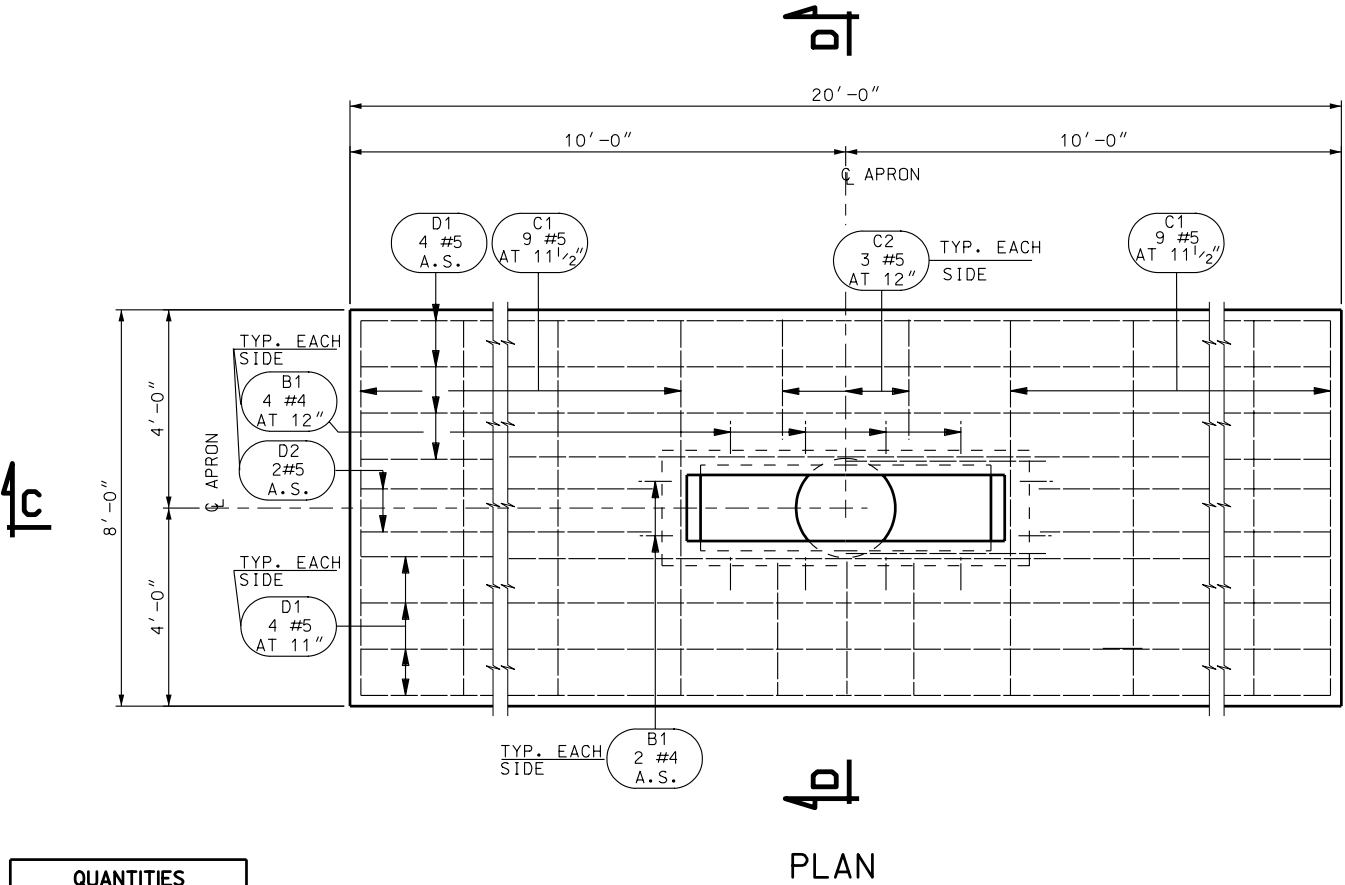
STANDARD DRAWING TITLE

STD DWG
CB 7A

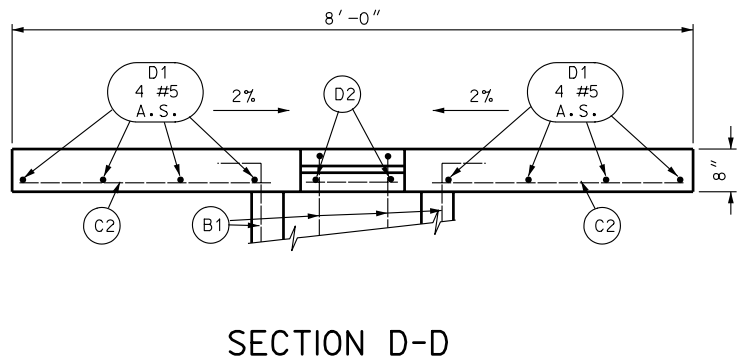
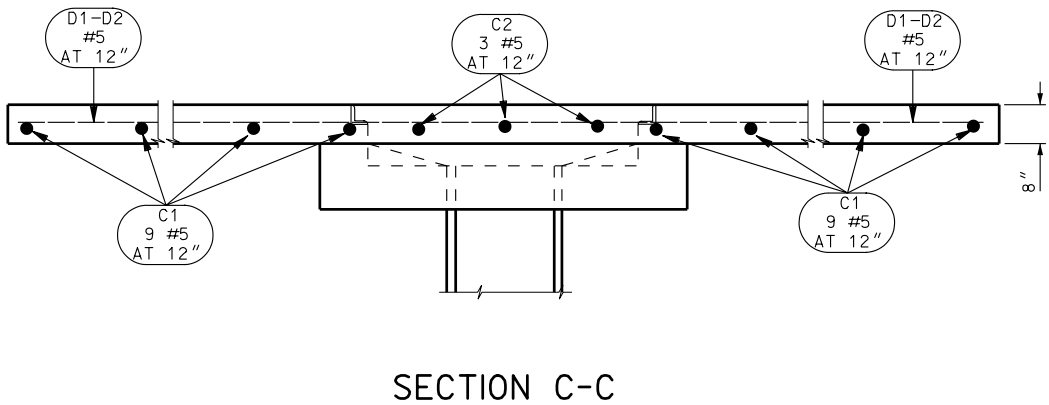
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QUANTITIES (FOR INFORMATION ONLY)	
REINF. STEEL (LB.)	CONC. (CU.YD.)
606	3.9

REINFORCING STEEL SCHEDULE								
A1			A2			A3		
SIZE	—		SIZE	—		SIZE	—	
	NO.	LENGHT		NO.	LENGHT		NO.	LENGHT
4	4	4'-4"	4	8	3'-5"	4	4	2'-0"
B1								
SIZE	1'-2"		SIZE	a		SIZE		
	NO.	a		NO.	a		NO.	
4	12	VARIES						
C1			C2					
SIZE	—		SIZE	—		SIZE	—	
	NO.	LENGHT		NO.	LENGHT		NO.	LENGHT
5	18	19'-6"	5	3	2'-10"			
D1			D2					
SIZE	—		SIZE	—		SIZE	—	
	NO.	LENGHT		NO.	LENGHT		NO.	LENGHT
5	8	19'-8"	5	4	5'-5"			



- NOTES:
1. CENTER APRON ON CHANNEL FLOWLINE.
 2. PLACE 6" OF UNTREATED BASE COURSE AND COMPACT PER UDOT STANDARD SPECIFICATIONS UNDER EACH APRON PRIOR TO FORMING.
 3. FIELD BEND D1 BARS AS REQUIRED TO CONFORM TO SLOPE.
 4. PROVIDE 2" CONCRETE COVER TO REINFORCING STEEL EXCEPT WHERE NOTED OTHERWISE.
 5. USE NORMAL APRON WITH DROP INLET TYPE "B."
 6. REPAIR ANY DAMAGE OR CUTS TO EPOXY COATING.

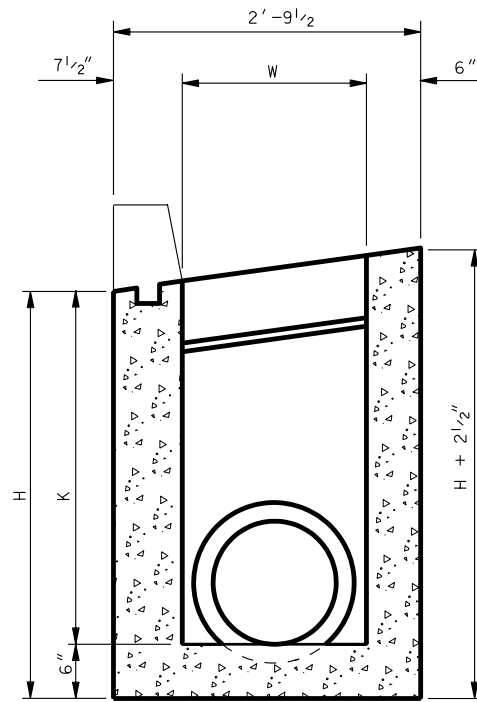
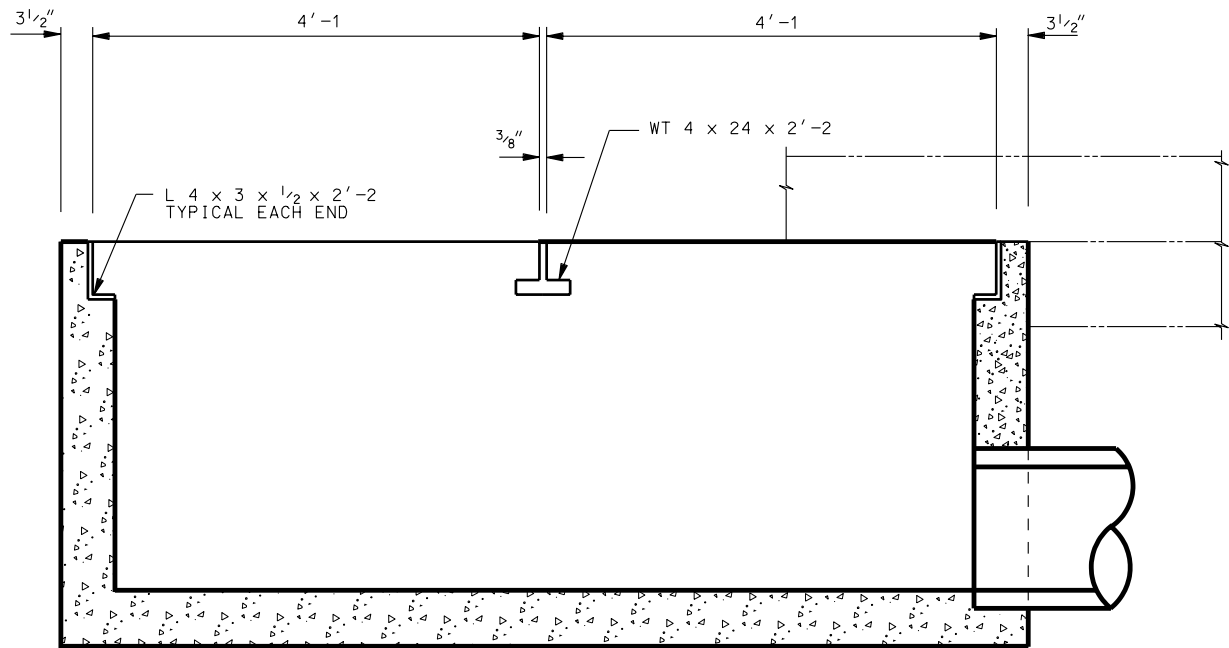
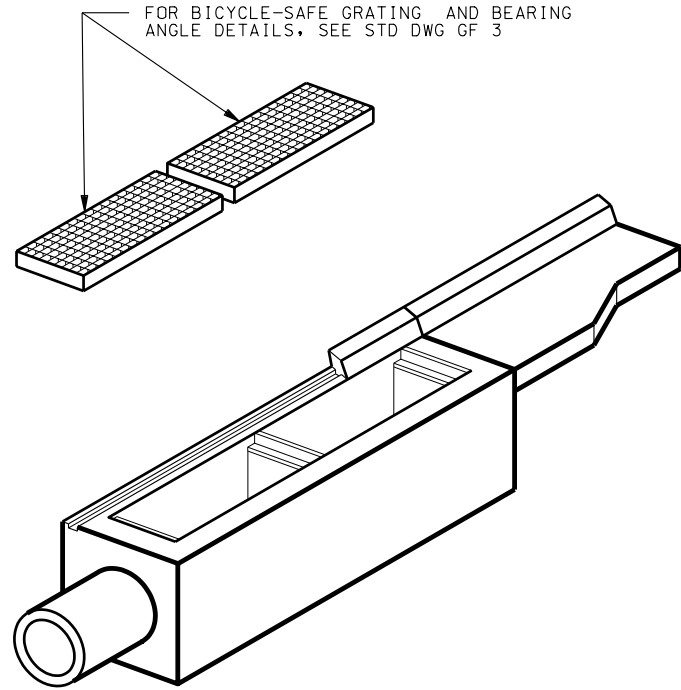
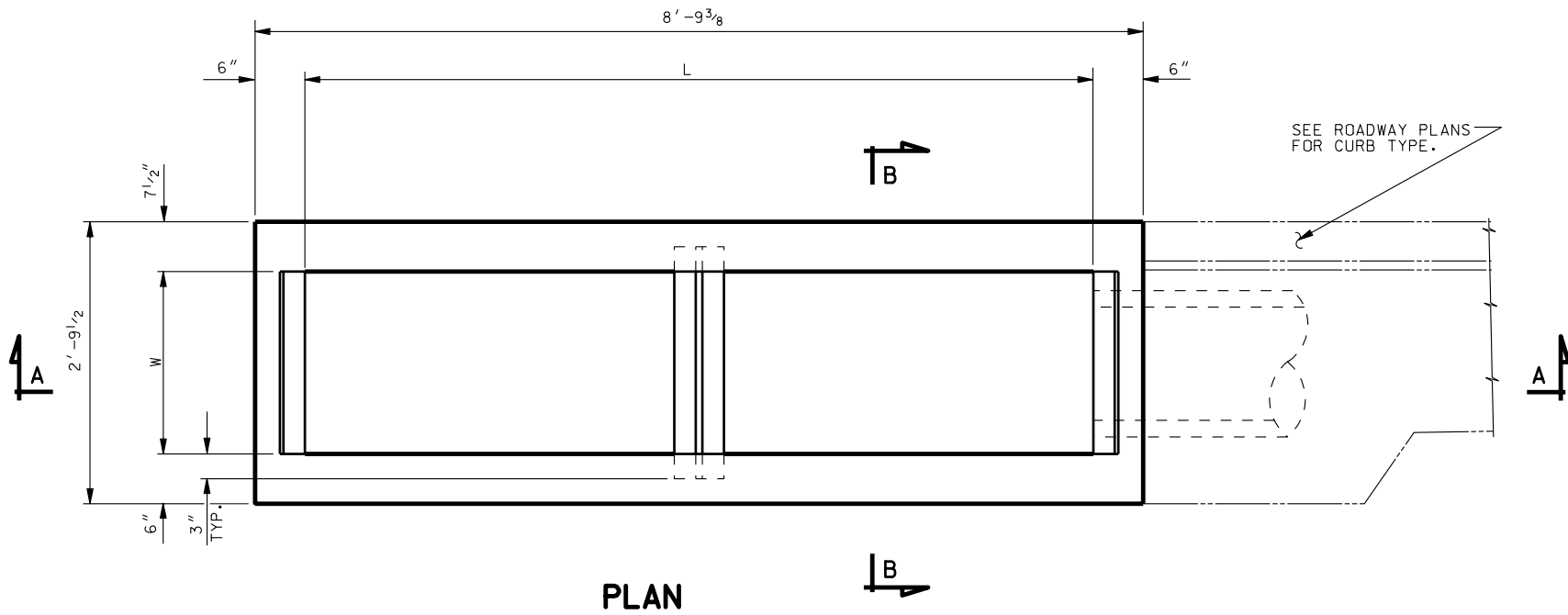


UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

NORMAL APRON
WITH DROP INLET
TYPE "B"

STD DWG
CB 7B



GENERAL NOTES FOR CB 8A TO CB 8B

1. USE COATED DEFORMED BILLET REINFORCING STEEL BARS CONFORMING TO AASHTO M 284 OR M 111 AND M 31 GRADE 60 RESPECTIVELY.
2. CHAMFER ALL EXPOSED CONCRETE CORNERS $\frac{3}{4}"$ EXCEPT WHERE NOTED OTHERWISE.
3. PROVIDE 2" CONCRETE COVER TO REINFORCING STEEL EXCEPT WHERE NOTED OTHERWISE.
4. USE STRUCTURAL CONCRETE FOR ALL CAST-IN-PLACE CONCRETE EXCEPT WHERE SPECIFIED OTHERWISE.
5. USE TYPE II CEMENT (LOW ALKALI) .
6. USE STRUCTURAL STEEL CONFORMING TO AASHTO M 270 GRADE 36 EXCEPT WHERE NOTED OTHERWISE.
7. SEE ROADWAY PLANS FOR LOCATION, SIZE AND PAYMENT OF PIPES.
8. HOT-DIP GALVANIZE GRATING AND BEARING ANGLES AFTER FABRICATION IN ACCORDANCE WITH AASHTO DESIGNATION M 111 (ASTM A 123).
9. USE CLASS AA(AE) CAST-IN-PLACE CONCRERE EXCEPT WHERE SPECIFIED OTHERWISE.

DESIGN DATA

HS 20-44 OR INTERSTATE ALTERNATE MILITARY LOADING IN ACCORDANCE WITH CURRENT AASHTO AND INTERIM SPECIFICATIONS.
STRUCTURAL CONCRETE: $F_c = 1400$ psi :
 F_s (REINF.) = 24,000 psi $n = 8$.

QUANTITIES

SEE STD DWG CB 8B SCHEDULE OF INSTALLATION

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

RECOMMENDED FOR APPROVAL
SALT LAKE CITY

CHAIRMAN STANDARDS COMMITTEE
APPROVED

DEPUTY DIRECTOR

DOUBLE CATCH BASIN

STD DWG
CB 8A

REVISIONS

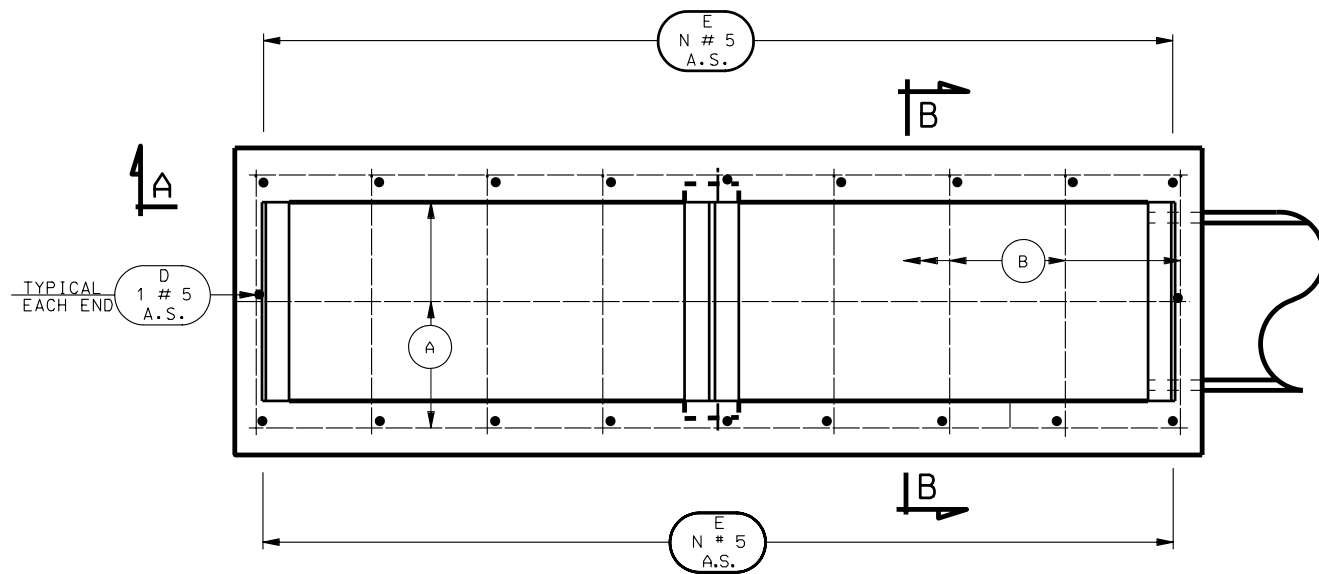
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REMARKS

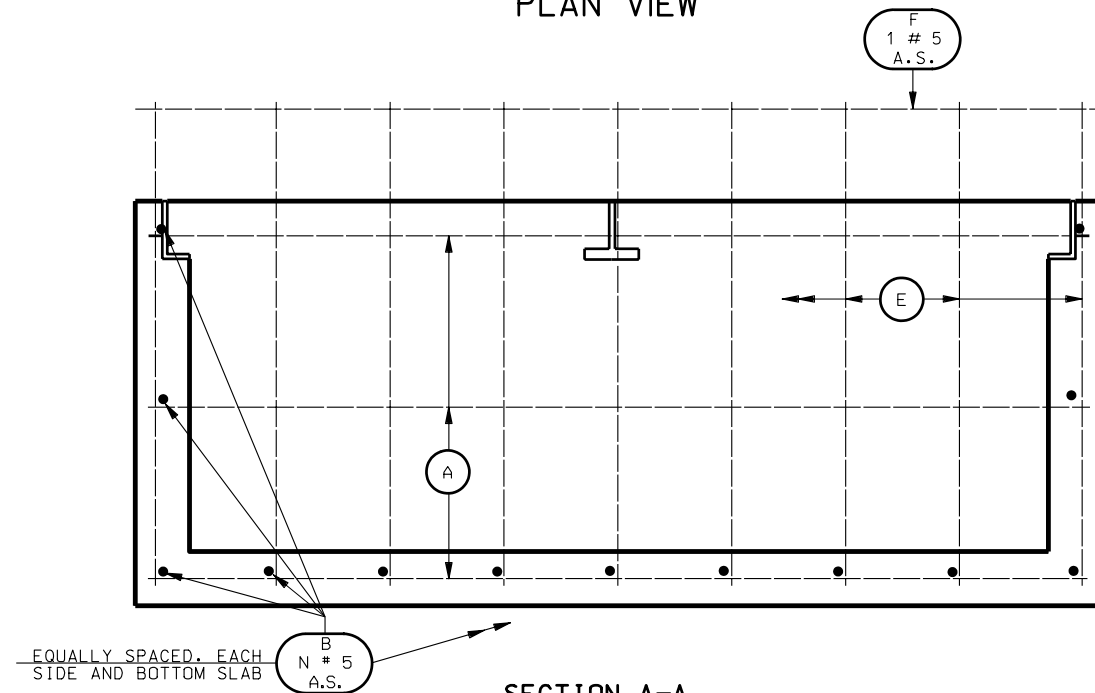
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DATE
JAN.01.2005
JAN.01.2005

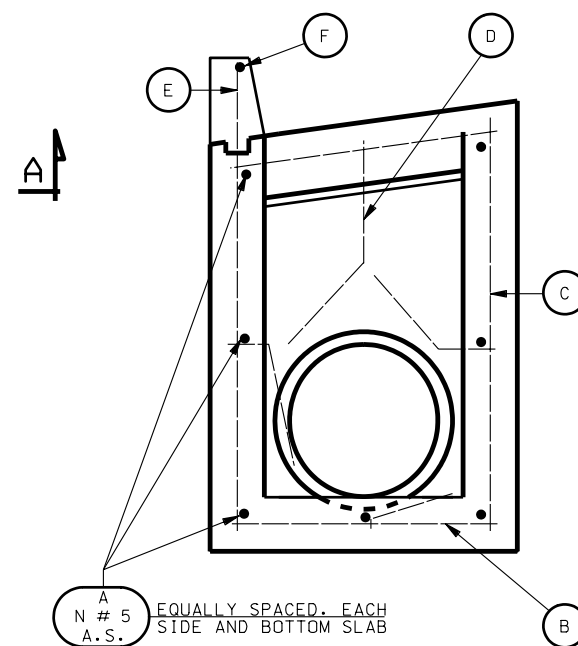
SCHEDULE OF INSTALLATION																					
LINE NO	DIMENSIONS				MAXIMUM PIPE DIA.		REINFORCING STEEL												QUANTITIES		
							A		B		C		D		E		F		REINFORCING STEEL	CONCRETE	STRUCTURAL STEEL
	H	W	L	K	R.C.P.	C.M.P.	N	LENGTH	N	LENGTH	N	LENGTH	N	LENGTH	N	LENGTH	N	LENGTH	LBS.	CUBIC YARD	LBS.
1	2'-0	1'-8	7'-9⅜	1'-6	----	15"	7	8'-6	13	2'-5	9	1'-9	2	1'-8	9	2'-0	1	11'-0	145.0	1.14	594.0
2	2'-6	1'-8	7'-9⅜	2'-0	12"	18"	9	8'-6	15	2'-5	9	2'-3	2	2'-2	9	2'-6	1	11'-0	178.2	1.33	594.0
3	3'-0	1'-8	7'-9⅜	2'-6	15"	18"	9	8'-6	15	2'-5	9	2'-9	2	2'-8	9	3'-0	1	11'-0	188.6	1.52	594.0
4	3'-6	1'-8	7'-9⅜	3'-0	18"	18"	11	8'-6	17	2'-5	9	3'-3	2	3'-2	9	3'-6	1	11'-0	221.8	1.71	594.0
5	4'-0	1'-8	7'-9⅜	3'-6	18"	18"	11	8'-6	17	2'-5	9	3'-9	2	3'-8	9	4'-0	1	11'-0	232.2	1.90	594.0



PLAN VIEW



SECTION A-A



SECTION B-B

R.C.P.		C.M.P.	
DIA.	CU. YDS.	DIA.	CU. YDS.
12"	0.023	12"	0.015
15"	0.031	15"	0.023
18"	0.041	18"	0.033

NOTES:

1. INCLUDE CONCRETE QUANTITIES FOR CURB AND GUTTER IN ROADWAY QUANTITIES.
2. DEDUCT CONCRETE DISPLACED BY PIPE(S), TABLE "A", FROM CONCRETE QUANTITIES GIVEN IN SCHEDULE OF INSTALLATION.
3. CUT AND BEND REINFORCING STEEL AS NECESSARY TO CLEAR PIPE(S) AND MAINTAIN 2" CLEARANCE.

[illegible]

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

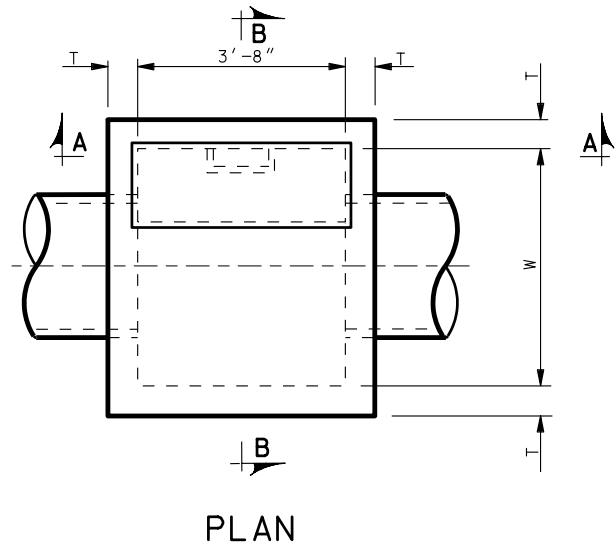
RECOMMENDED FOR APPROVAL		SALT LAKE CITY, UTAH
CHAIRMAN STANDARDS COMMITTEE		
APPROVED		
DATE	JAN.01.2005	
DATE	JAN.01.2005	
DATE		

DOUBLE CATCH BASIN

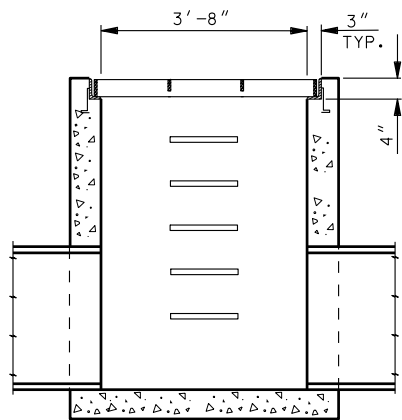
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STD DWG

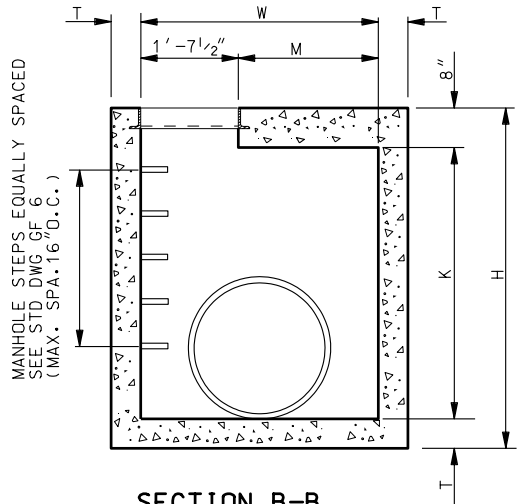
CB 8B



PLAN

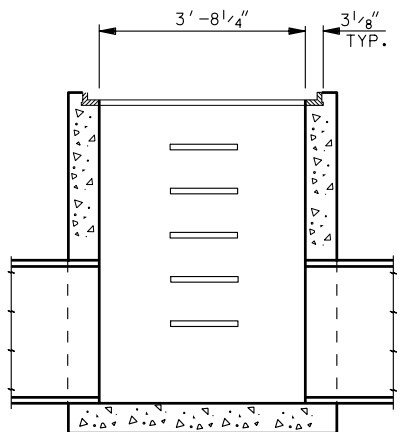


SECTION A-A

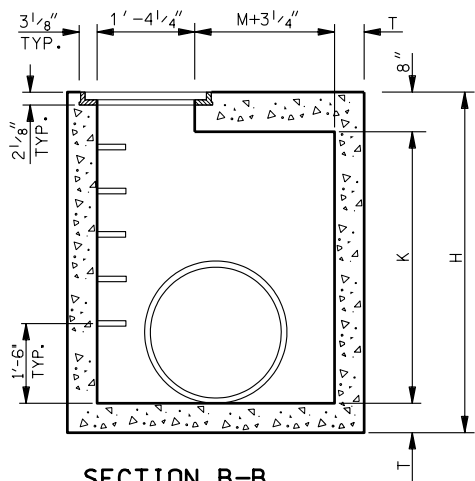


SECTION B-B

CATCH BASIN
GRATE AND FRAME APPLICATION

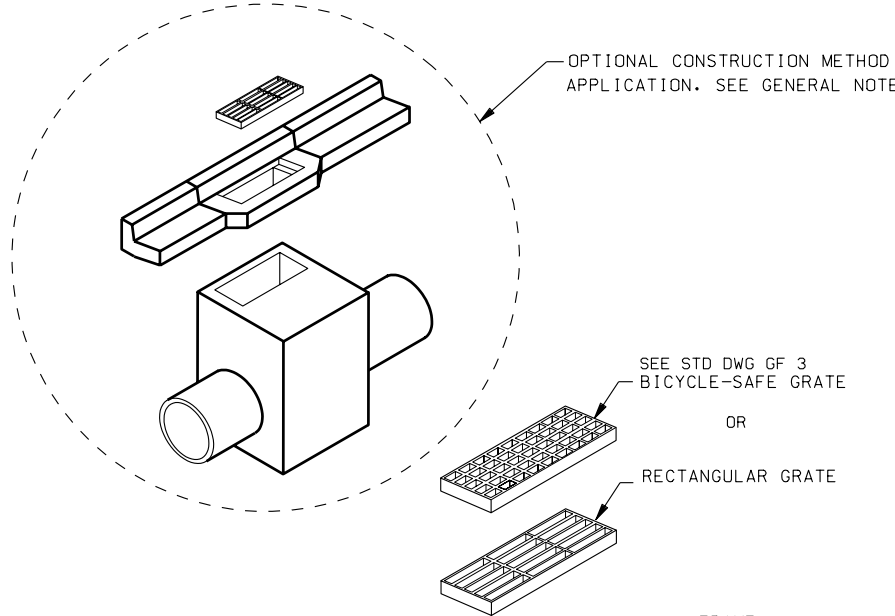


SECTION A-A

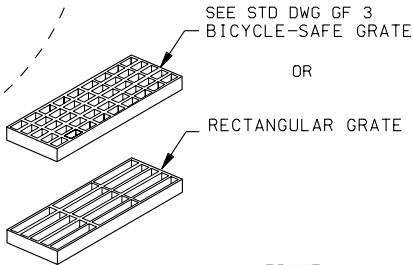


SECTION B-B

CLEANOUT BOX
SOLID COVER APPLICATION



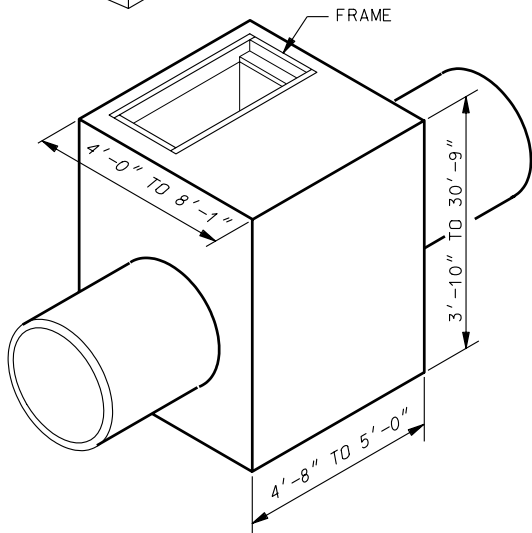
OPTIONAL CONSTRUCTION METHOD FOR CURB & GUTTER APPLICATION. SEE GENERAL NOTE 9.



SEE STD DWG GF 3
BICYCLE-SAFE GRATE

OR

RECTANGULAR GRATE



FRAME

GENERAL NOTES FOR CB 9A TO CB 9D

1. COAT ALL REINFORCING STEEL, DEFORMED BILLET-STEEL BARS CONFORMING TO AASHTO DESIGNATION M 31, GRADE 60.
2. USE TYPE II CEMENT (LOW ALKALI) UNLESS SPECIFIED OTHERWISE.
3. CHAMFER $\frac{3}{4}$ " ALL EXPOSED CONCRETE CORNERS EXCEPT WHERE NOTED OTHERWISE.
4. USE CONCRETE CLASS AA(AE) FOR ALL CAST-IN-PLACE CONCRETE EXCEPT WHERE SPECIFIED OTHERWISE.
5. COVER TO REINFORCING 2" : EXCEPT WHERE NOTED OTHERWISE.
6. USE STRUCTURAL CARBON STEEL FOR STRUCTURAL STEEL GRATING CONFORMING TO AASHTO DESIGNATION M 270, GRADE 36 (ASTM A 709, GRADE 36)
7. SEE STD DWG GF 3 AND GF 5 FOR GRATING, FRAME AND SOLID COVER DETAILS.
8. SEE ROADWAY PLANS FOR DETAILS OF INSTALLATION, INCLUDING LOCATION OF UNITS, NUMBER OF UNITS REQUIRED, TYPE OF UNITS, SIZE AND LOCATION OF PIPE(S).
9. FOR CURB & GUTTER APPLICATIONS ADJUST FINISH GRADE ELEVATION OF BOX AS REQUIRED. INCLUDE CONCRETE QUANTITIES FOR CURB & GUTTER IN ROADWAY QUANTITIES.

DESIGN DATA

MS 18 (HS-20) OR INTERSTATE ALTERNATE LOADING IN ACCORDANCE WITH CURRENT AASHTO AND INTERIM SPECIFICATIONS.

CAST-IN-PLACE STRUCTURAL CONCRETE: $f_c = 1,400$ psi, $n = 8$

REINF. STEEL: $f_c = 24,000$ psi

STRUCTURAL STEEL: $f_s = 20,000$ psi

QUANTITIES

STRUCTURAL CONCRETE } SEE SCHEDULE OF INSTALLATION
REINFORCING STEEL }

INDEX OF SHEETS

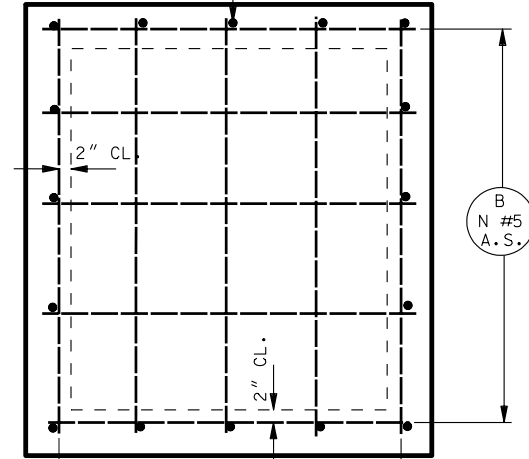
- A- SITUATION & LAYOUT
- B- SECTION DETAILS
- C- SCHEDULE OF INSTALLATION FOR 18"-42" RCP. 12"-48" CMP.
- D- SCHEDULE OF INSTALLATION FOR 48"-66" RCP. 60"-78" CMP.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

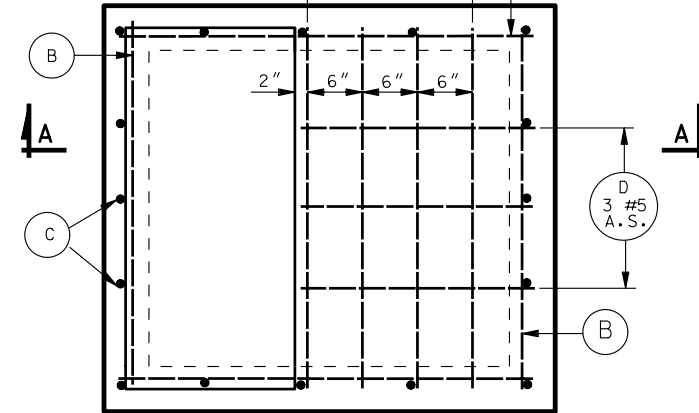
RECOMMENDED FOR APPROVAL
CHAIRMAN, STANDARD DRAWING COMMITTEE
APPROVED
DEPUTY DIRECTOR
DATE
JAN 01 2005
DATE
JAN 01 2005

STANDARD CATCH BASIN
AND CLEANOUT BOX
SITUATION AND LAYOUT

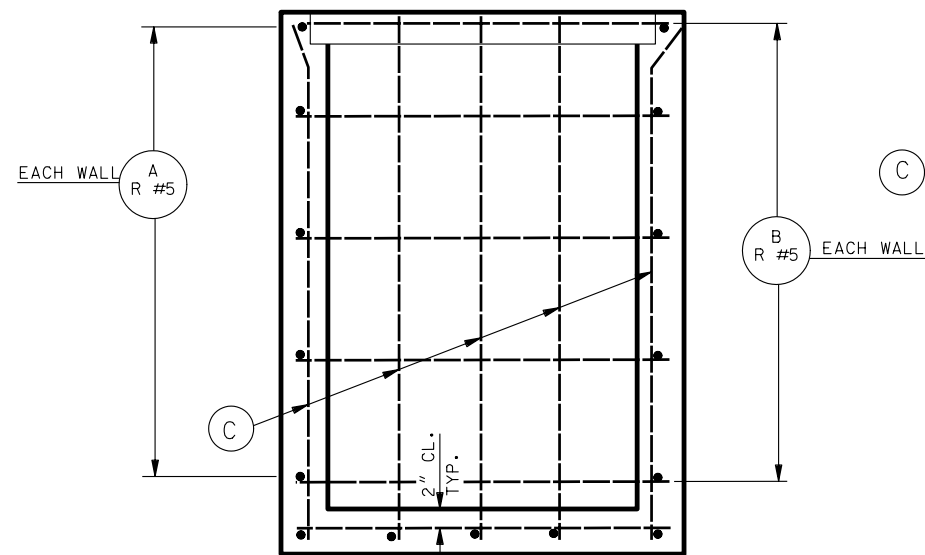
STD DWG
CB 9A



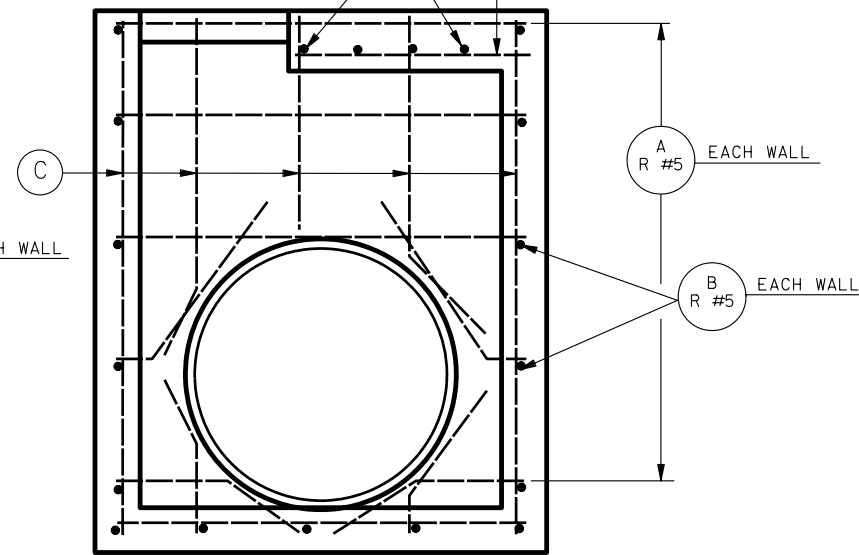
PLAN BOTTOM SLAB



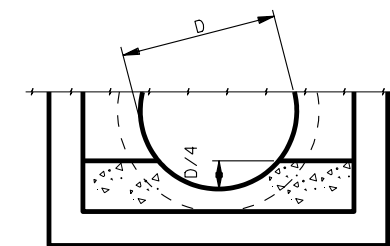
PLAN TOP SLAB



SECTION B-B



SECTION A-A



FORMED INVERT

NOTES

1. FORM THE BOTTOM SLAB OF THE BOX TO FIT THE INVERT OF THE PIPE(S) WHEN SO REQUIRED ACCORDING TO THE DETAIL SHOWN ON THIS SHEET.
SEE TABLE 3 ON STD DWG 9C AND CB 9D FOR ADDITIONAL CONCRETE QUANTITIES.
2. DEDUCT CONCRETE DISPLACED BY PIPE(S) FROM THOSE CONCRETE QUANTITIES GIVEN IN SCHEDULE OF INSTALLATION TABLE 1 ON STD DWG CB 9C AND CB 9D.
3. WHEN FORMED INVERT IS REQUIRED, SEE TABLE 3 ON STD DWG CB 3 AND CB 4 FOR ADDITIONAL CONCRETE QUANTITIES.
4. FIELD CUT AND BEND REINFORCING STEEL AS NECESSARY TO CLEAR PIPE(S) AND MAINTAIN 2 INCHES MINIMUM CLEARANCE.
5. UNLESS OTHERWISE SHOWN, ALL DIMENSIONS ARE OUT TO OUT OF BARS.
6. WEIGHT QUANTITIES FOR GRATE AND FRAME AND SOLID COVER AND ARE SHOWN FOR INFORMATION ONLY.
7. SEE STD DWG CB 9 FOR DIMENSIONS.
8. PIPE DIAMETERS SHOWN IN TABLES AND SCHEDULE ARE INSIDE DIAMETERS.
9. MAXIMUM PIPE DIMENSIONS SHOWN IN SCHEDULE IN INSTALLATION ARE FOR PIPES PERPENDICULAR TO WALLS OF BOX, DETERMINE CLEARANCES FOR SKEWED PIPES.
10. SEE STD DWG GF 6 FOR MANHOLE STEP DETAILS.
11. ALL REINFORCING BARS TO BE #5 BARS @ 12" UNLESS OTHERWISE SHOWN.
12. WHEN SOLID COVER IS REQUIRED ADD 0.023 CU.YDS. CONCRETE TO THOSE QUANTITIES GIVEN IN SCHEDULE OF INSTALLATION AND 3" TO EACH D-BAR, AND 1.0 LB. TO REINFORCING STEEL QUANTITIES.

[illegible]

NOTE: LINES MARKED WITH * REFER TO METAL PIPE ONLY.

TABLE 2 : MAXIMUM PIPE SIZE TO BE USED

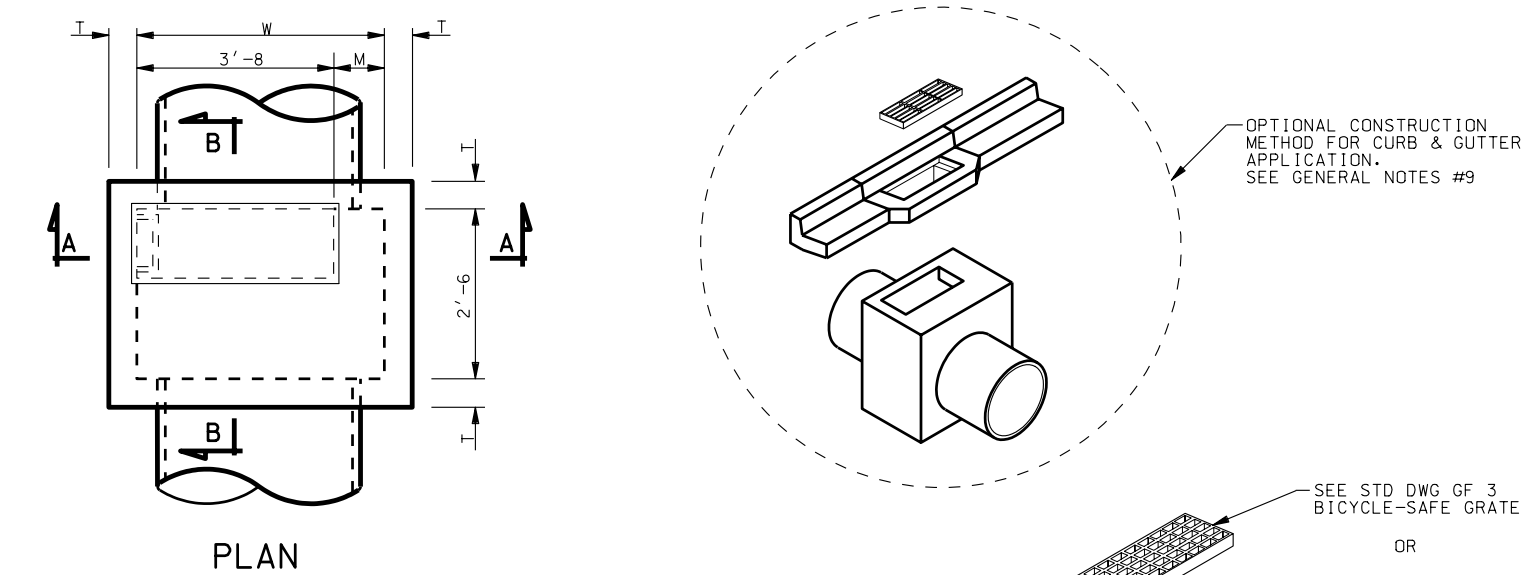
	RCP	CMP
COL. E	48*	60*
COL. F	54*	66*
COL. G	60*	72*
COL. H	66*	78*

PIPE SIZES	48"	54"	60"	66"	72"	78"	
RCP (yd ³)	0.676	0.814	0.964	1.126	----	----	
CMP (yd ³)	----	----	0.370	0.443	0.522	0.609	

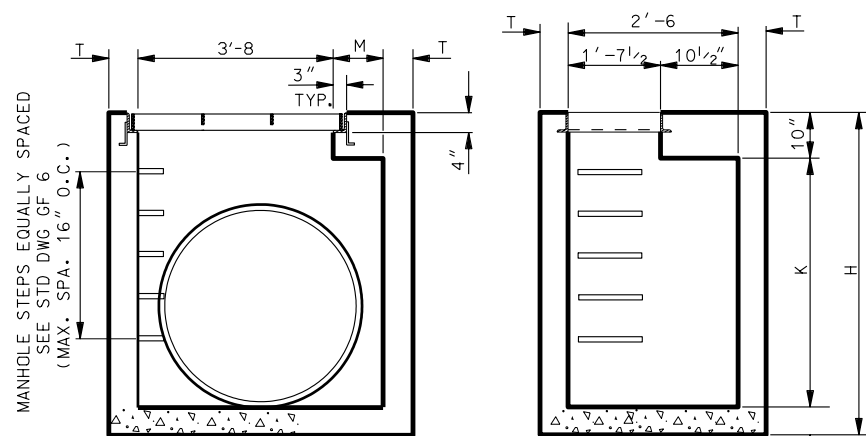
STRUCTURAL STEEL :

RECTANGULAR GRATE & FRAME	= 340 lbs
BICYCLE-SAFE GRATE & FRAME	= 365 lbs
SOLID COVER & FRAME	= 474 lbs

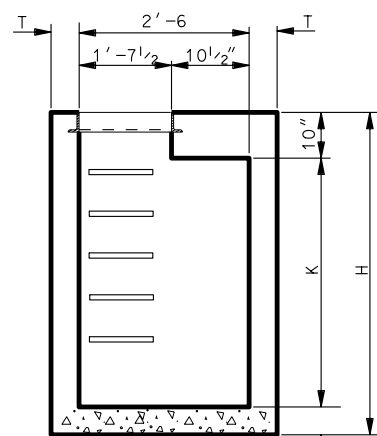
STD DWG
CB 9D



PLAN

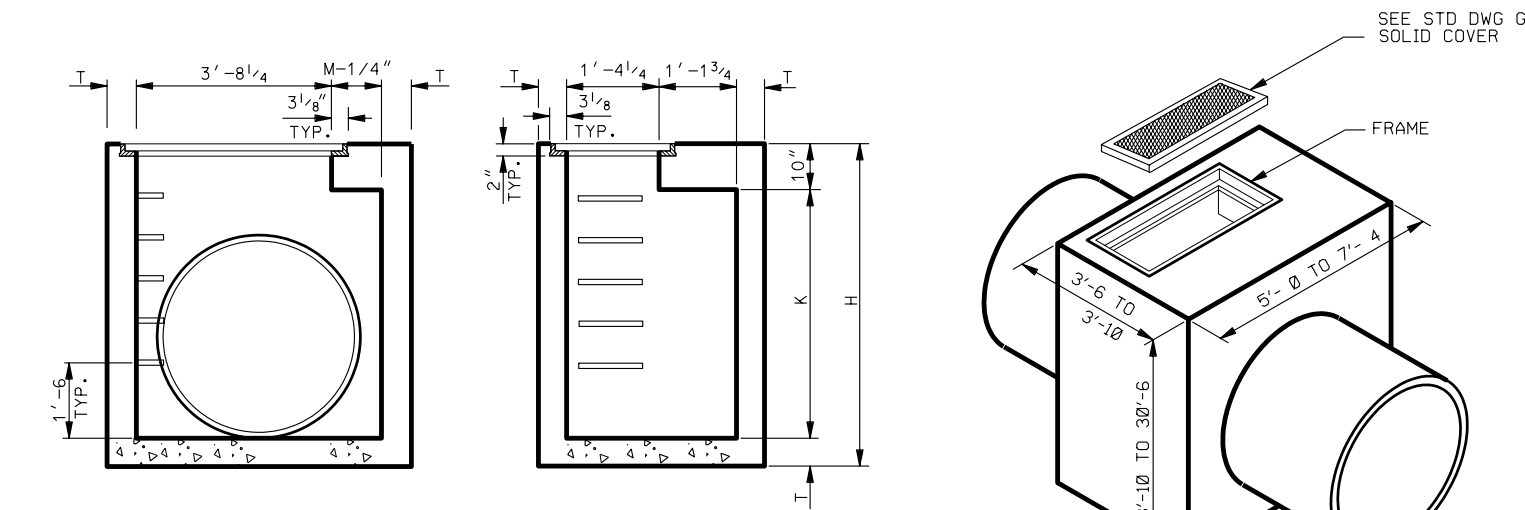


SECTION A-A



SECTION B-B

CATCH BASIN
GRATE AND FRAME APPLICATION



SECTION A-A

SECTION B-B

CLEANOUT BOX
SOLID COVER APPLICATION

GENERAL NOTES FOR CB 10A TO CB 10C

1. USE COATED DEFORMED BILLET REINFORCING STEEL BARS CONFORMING TO AASHTO M 284 OR M 111 AND M 31 GRADE 60 RESPECTIVELY.
2. USE TYPE II CEMENT (LOW ALKALI) UNLESS SPECIFIED OTHERWISE.
3. CHAMFER ALL EXPOSED CORNER $\frac{3}{4}$ " EXCEPT WHERE NOTED OTHERWISE.
4. USE CONCRETE CLASS AA(AE) FOR ALL CAST-IN-PLACE CONCRETE EXCEPT WHERE SPECIFIED OTHERWISE.
5. PROVIDE 2" CONCRETE COVER TO REINFORCING STEEL EXCEPT WHERE NOTED OTHERWISE.
6. USE STRUCTURAL STEEL CONFORMING TO AASHTO M 270 GRADE 36 EXCEPT WHERE NOTED OTHERWISE.
7. SEE STD DWG GF 3 AND GF 5 FOR GRATING, FRAME AND SOLID COVER DETAILS.
8. SEE ROADWAY PLANS FOR DETAILS OF INSTALLATION, INCLUDING LOCATION OF UNITS NUMBER OF UNITS REQUIRED, TYPE OF UNITS, SIZE AND LOCATION OF PIPE(S).
9. FOR CURB & GUTTER APPLICATIONS ADJUST FINISH GRADE ELEVATION OF BOX AS REQUIRED. INCLUDE CONCRETE QUANTITIES FOR CURB & GUTTER IN ROADWAY QUANTITIES.
10. USE CLASS AA(AE) CAST-IN-PLACE CONCRETE EXCEPT WHERE SPECIFIED OTHERWISE.

DESIGN DATA

HS-20-44 OR INTERSTATE ALTERNATE MILITARY LOADING IN ACCORDANCE WITH CURRENT AASHTO AND INTERIM SPECIFICATIONS.

CAST-IN-PLACE STRUCTURAL CONCRETE: $F_c = 1,400$ psi $n = 8$
REINF. STEEL: $F_s = 24,000$ psi
STRUCTURAL STEEL: $F_s = 20,000$ psi

QUANTITIES

STRUCTURAL CONCRETE] SEE SCHEDULE OF INSTALLATION
REINFORCING STEEL]

INDEX OF SHEETS

- (CB 10A) 1- SITUATION & LAYOUT
(CB 10B) 2- SECTION DETAILS
(CB 10C) 3- SCHEDULE OF INSTALLATION
FOR 42"-60" RCP. 48"-72" CMP.

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

RECOMMENDED FOR APPROVAL

JAN.01.2005

DATE

JAN.01.2005

DATE

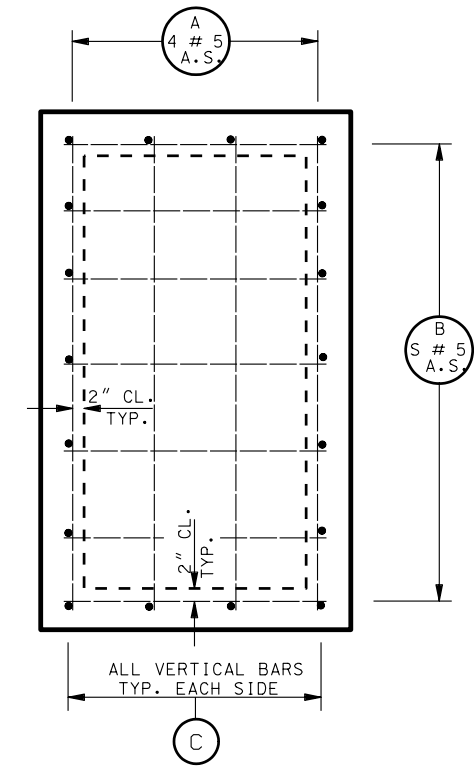
DEPUTY DIRECTOR

STANDARD CATCH BASIN
AND CLEANOUT BOX
SITUATION AND LAYOUT

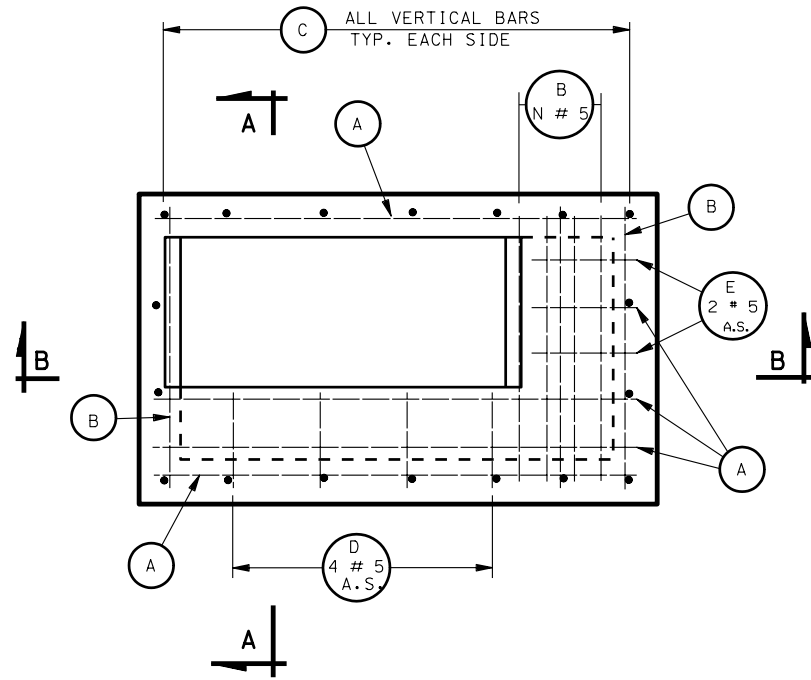
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STD DWG

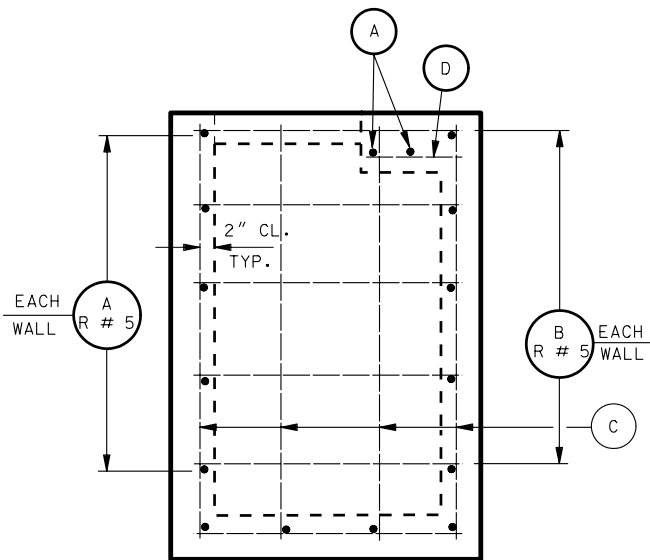
CB 10A



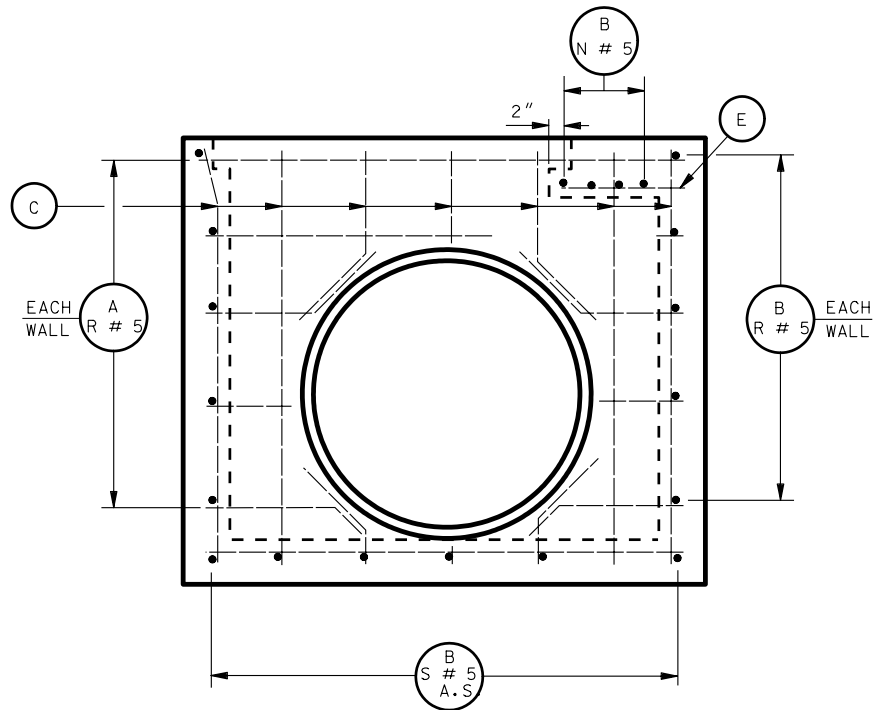
PLAN BOTTOM SLAB



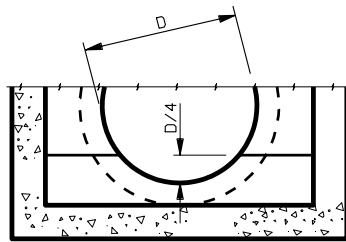
PLAN TOP SLAB



SECTION A-A



SECTION B-B



FORMED INVERT

NOTES:

1. QUANTITIES SHOWN IN THE SCHEDULE OF INSTALLATION ARE FOR ONE UNIT ONLY.
2. FORM THE BOTTOM SLAB OF THE BOX TO FIT THE INVERT OF THE PIPE(S) WHEN SO REQUIRED ACCORDING TO THE DETAIL SHOWN ON THIS SHEET. SEE TABLE 3 ON STD DWG CB 10C FOR ADDITIONAL CONCRETE QUANTITIES.
3. DEDUCT CONCRETE DISPLACED BY PIPE(S) FROM THOSE CONCRETE QUANTITIES GIVEN IN SCHEDULE OF TABLE 1 ON STD DWG CB 10C.
4. WHEN FORMED INVERT IS REQUIRED, SEE TABLE 3 ON STD DWG CB 10C FOR ADDITIONAL CONCRETE QUANTITIES.
5. PROVIDE 2" CONCRETE COVER TO REINFORCING STEEL EXCEPT WHERE NOTED OTHERWISE.
6. UNLESS OTHERWISE SHOWN, ALL DIMENSIONS ARE OUT TO OUT OF BARS.
7. WEIGHT QUANTITIES FOR GRATE AND FRAME, AND SOLID COVER AND FRAME ARE SHOWN FOR INFORMATION ONLY.
8. SEE STD DWG CB 10A FOR DIMENSIONS.
9. PIPE DIAMETERS SHOWN IN TABLES AND SCHEDULE ARE INSIDE DIAMETERS.
10. MAXIMUM PIPE DIMENSIONS SHOWN IN SCHEDULE OF INSTALLATION ARE FOR PIPES PERPENDICULAR TO WALLS OF BOX. DETERMINE CLEARANCES FOR SKEWED PIPES.
11. SEE STD DWG GF 6 FOR MANHOLE STEP DETAILS.
12. USE #5 BARS FOR ALL REINFORCING @ 12" UNLESS OTHERWISE SHOWN.
13. WHEN SOLID COVER IS REQUIRED, ADD .023 CU.YDS. OF CONCRETE TO THOSE QUANTITIES GIVEN IN SCHEDULE OF INSTALLATION AND ADD 3" TO EACH D-BAR, AND 1.0 LB TO REINFORCING STEEL QUANTITIES.
14. USE COATED DEFORMED BILLET REINFORCING STEEL BARS CONFORMING TO AASHTO M 284, OR M 111 AND M 31 GRADE 60 RESPECTIVELY.
15. CHAMFER ALL EXPOSED CONCRETE CORNERS $\frac{3}{4}$ " EXCEPT WHERE NOTED OTHERWISE.
16. USE CLASS AA(AE) CAST CONCRETE EXCEPT WHERE SPECIFIED OTHERWISE.

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

SALE PRICE \$1.00

RECOMMENDED FOR APPROVAL

CHAIRMAN STANDARDS COMMITTEE

APPROVED

DEPUTY DIRECTOR

STANDARD CATCH BASIN
AND CLEANOUT BOX
SECTION DETAILS

STD DWG
CB 10B

STANDARD DRAWING TITLE

REVISIONS

REMARKS

NO. DATE

APPR. DATE

DATE

DATE

[illegible]

TABLE 1 : CONCRETE DISPLACED BY PIPES:

PIPE SIZES		6"	7"	8"
R.C.P.	C.M.P.	CU. YD.	CU. YD.	CU. YD.
42"	48"	0.233	0.271	0.310
48"	60"	0.340	0.396	0.453
54"	66"	0.427	0.498	0.569
60"	72"	0.524	0.611	0.698
	54"	0.295	0.344	0.393

TABLE 2 : MAXIMUM PIPE SIZE TO BE USED:

	R.C.P.	C.M.P.
COLUMN A	42°	48°
COLUMN B	48°	60°
COLUMN C	54°	66°
COLUMN D	60°	72°

TABLE 3 : CONCRETE NEEDED FOR FORMED INVERT:

PIPES SIZES	R.C.P. CU. YD.	C.M.P. CU. YD.
42"	0.273	----
48"	0.428	0.143
54"	----	----
60"	0.617	0.223
66"	----	0.270
72"	----	0.322

STRUCTURAL STEEL :

RECTANGULAR GRATE & FRAME	= 340 LBS
BICYCLE - SAFE GRATE & FRAME	= 365 LBS.
SOLID COVER & FRAME	= 474 LBS.

STANDARD CATCH BASIN
AND CLEANOUT BOX
SCHEDULE OF
INSTALLATION
42" TO 60" RCP
48" TO 72" CMP

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

RECOMMENDED FOR APPROVAL	JAN.01,2005
CHAIRMAN STANDARDS COMMITTEE	DATE
APPROVED	JAN.01,2005
DEPUTY DIRECTOR	DATE

REVISIONS

REMARKS

NO.	DATE	APPR.
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DATE _____

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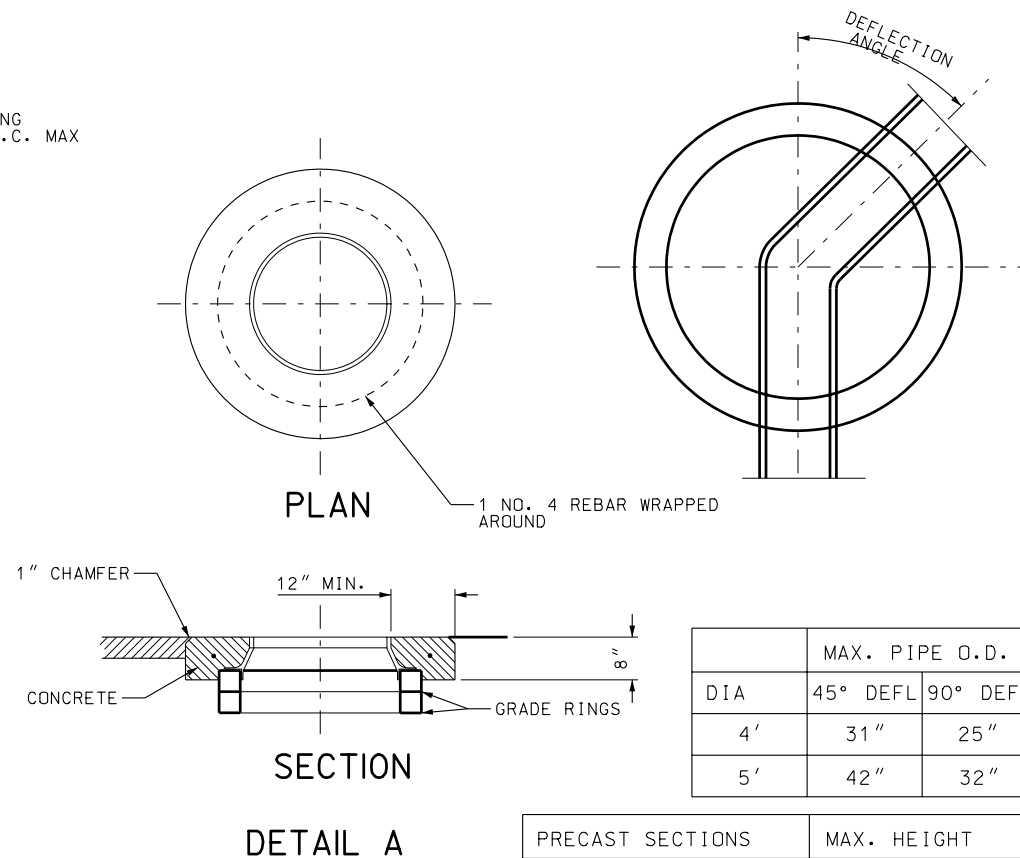
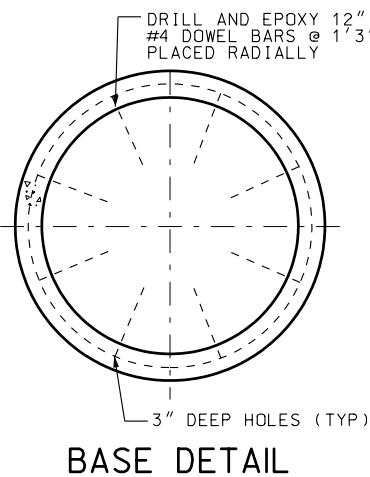
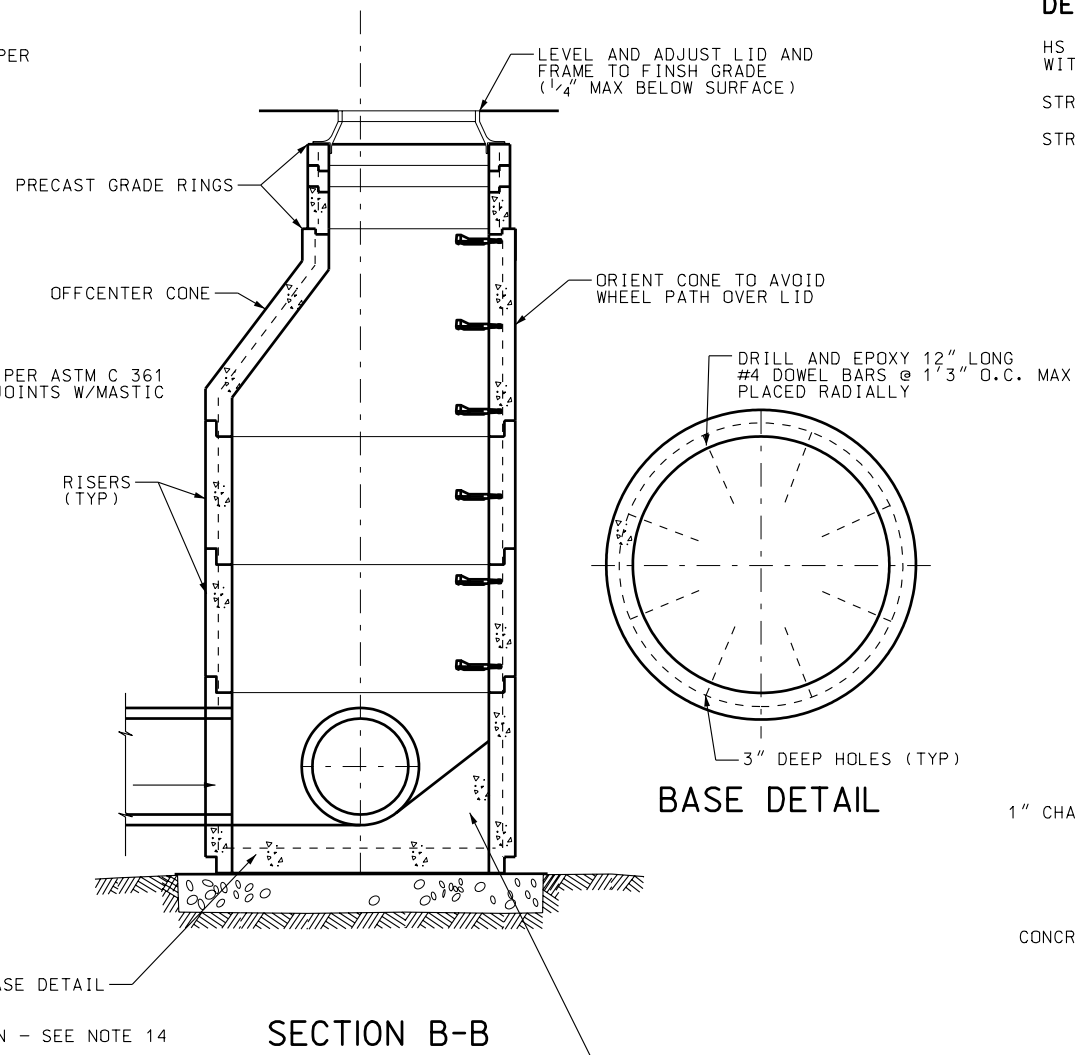
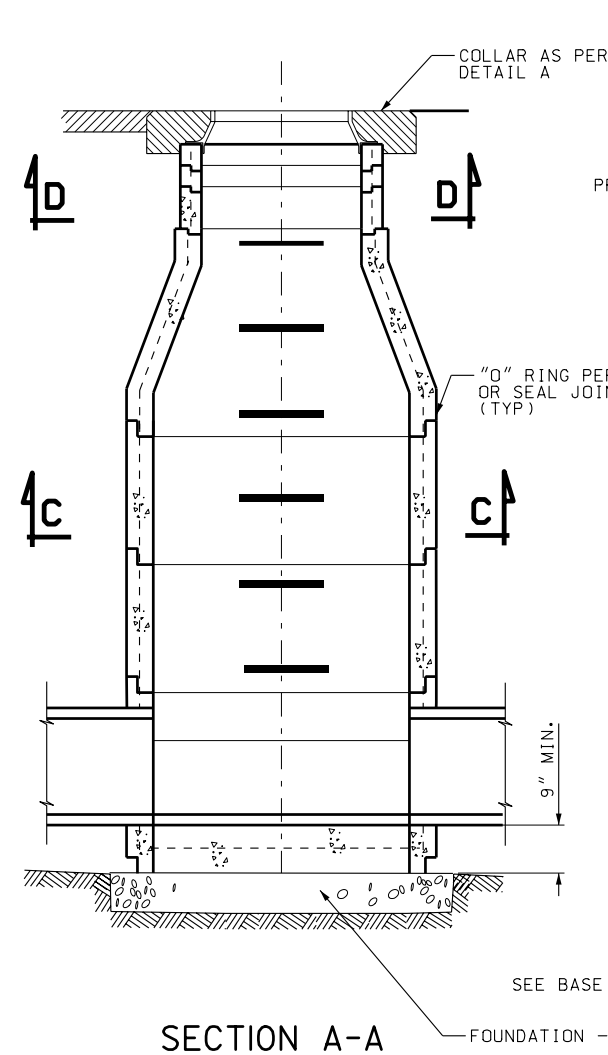
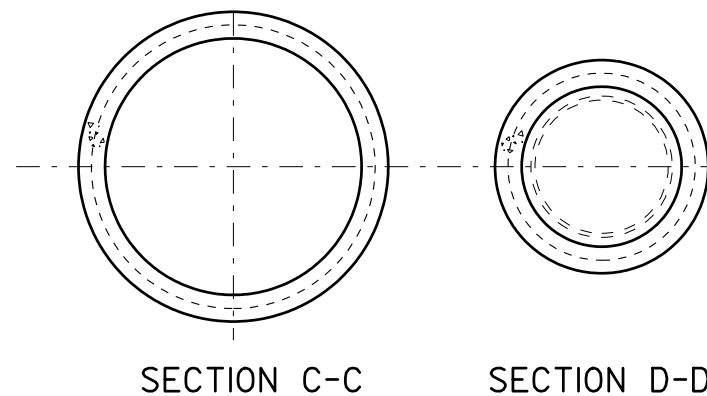
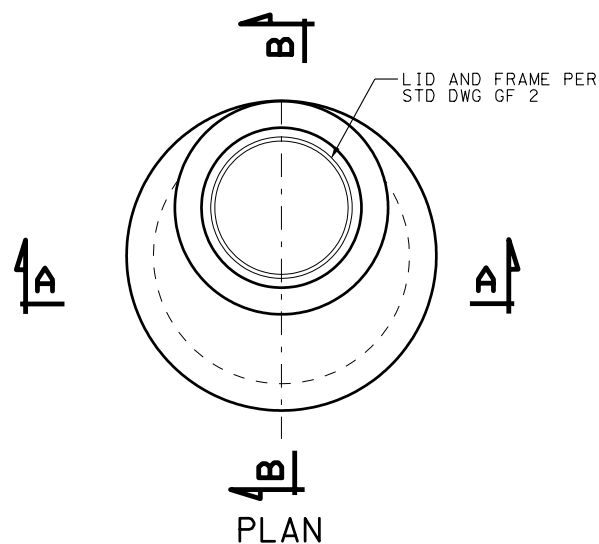
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1

ING

WDAR



PRECAST SECTIONS	MAX. PIPE O.D.	
	45° DEFL	90° DEFL
GRADE RINGS	31"	25"
COMBINED GRADE RINGS	42"	32"
CONES	36"	
RISERS	48"	

NOTES:

1. USE 3", 4", 6", OR 8" HIGH GRADE RINGS.
2. USE SECTIONS 1'-0", 1'-6", 2'-0", 3'-0" OR 4'-0" HIGH.
3. IF THE REQUIRED RAISE IS MORE THAN 1'-0", REMOVE THE CONE AND ADD RISER RINGS TO THE RISER SECTION. COMPACT BACKFILL TO A MINIMUM OF 90% DENSITY AND REPLACE THE ROADWAY SURFACING IN KIND.
4. PREVENT DEBRIS FROM FALLING INTO THE MANHOLE DURING CONSTRUCTION. CLEAN AND REMOVE ANY DEBRIS IN THE MANHOLE AND CONNECTING PIPES.
5. REPAIR ANY DAMAGE OR REPLACE DAMAGED MANHOLES TO THE SATISFACTION OF THE ENGINEER AT NO ADDITIONAL COST TO THE DEPARTMENT.
6. USE COATED DEFORMED BILLET REINFORCING STEEL BARS CONFORMING TO AASHTO M 284 OR M 111 AND M 31 GRADE 60 RESPECTIVELY.
7. FOR LID AND FRAME SEE STD DWG GF 2.
8. USE CLASS AA (AE) CONCRETE.
9. USE TYPE II CEMENT (LOW ALKALI).
10. PROVIDE 2" CONCRETE COVER TO REINFORCING STEEL.
11. PROVIDE HYDRAULIC CEMENT MORTAR ACCORDING TO ASTM C 185 AND PRECAST MANHOLE SECTIONS PER ASTM C 478.
12. PLACE STEPS BEGINNING 2' BELOW FINISHED GRADE AS PER STD DWG GF 6.
13. SUBMIT DESIGN FOR MANHOLES GREATER THAN 5' IN DIAMETER OR DEEPER THAN 18' TO ENGINEER FOR APPROVAL.
14. DO NOT OVEREXCAVATE. PLACE 6" MIN. UTBC BEDDING ACCORDING TO SECTION 02721 ON FIRM SUBGRADE. DO NOT USE CRUSHED ROCK IN ACTIVE WATERTABLE WITHOUT APPROVAL OF THE ENGINEER.

DESIGN DATA

HS 20 OR INTERSTATE ALTERNATE LOADING IN ACCORDANCE WITH AASHTO 17th EDITION SPECIFICATIONS.

STRUCTURAL STEEL: $F_y = 36,000 \text{ psi}$
STRUCTURAL CONCRETE: $f'_c = 4,000 \text{ psi}$
 $f_y = 60,000 \text{ psi}$
 $n = 8$

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

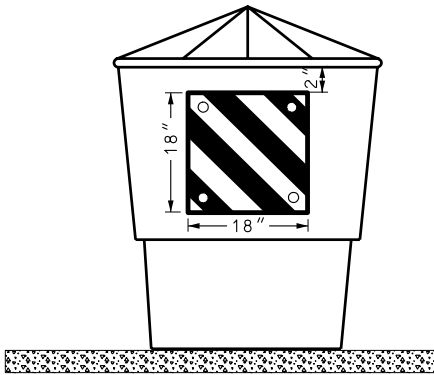
RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
DEPUTY DIRECTOR
JAN 01 2005
DATE
JAN 01 2005
DATE

STANDARD
MANHOLE

STD DWG
CB 11

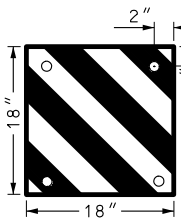
CRASH CUSHIONS
TYPE A,B & D

TYPE E



PLACE THE APPROPRIATE OBJECT MARKER PANEL OR SHEETING 2 INCHES FROM THE TOP OF THE LEAD BARREL OF THE ARRAY. MARKER POST NOT REQUIRED.

MARKER PLATE



2" 1/16" HOLES

USE A 0.032 GAUGE ALUMINUM MARKER PLATE WITH APPROPRIATE MARKER SHEETING

USE FOUR 1 INCH X 3/8 INCH ZINC PLATED BOLTS WITH WASHERS AND NUTS TO MOUNT PLATE.

SELF ADHESIVE SHEETING WITH APPROPRIATE OBJECT MARKER DESIGNATION CAN BE USED AS A SUBSTITUTE.

MARKER POST

PLACE YELLOW BANDS OF REFLECTIVE SHEETING AS SPECIFIED BY STANDARD SPECIFICATION, SECTION 02891, PART 2 AT THE TOP OF THE POST WITH A 2 INCH SPACE BETWEEN THE 1ST AND 2ND BAND AND THE 2ND AND 3RD BAND. DRILL THREE MOUNTING HOLES, 1/16 INCH IN DIAMETER, MEASURED FROM THE BOTTOM UP 5 INCHES, 12 INCHES AND 17 INCHES.

MARKER POST MOUNTING

MOUNT MARKER POST 48 INCHES FROM THE BOTTOM OF THE THIRD YELLOW BAND TO GROUND LEVEL. DO NOT COLLAPSE MARKER POST WHEN SECURING TO SYSTEM.

WOOD POST: PLACE MARKER POST ON THE FRONT OF THE FIRST POST OF SYSTEM AND SECURE WITH THREE 3/8 X 4 INCH ZINC PLATED LAG BOLTS AND WASHERS.

METAL POST: PLACE MARKER POST ON THE FRONT OF THE FIRST POST OF SYSTEM AND SECURE WITH THREE 3/8 X 3 INCH ZINC PLATED BOLTS WITH NUTS AND WASHERS.

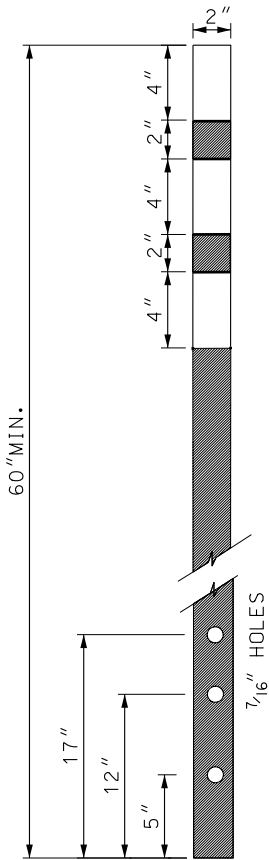
PLASTIC NOSE PIECES: PLACE MARKER POST 12 INCHES FORWARD FROM THE BACK EDGE OF THE NOSE PIECE AND SECURE WITH THREE 3/8 X 3 INCH ZINC PLATED BOLTS WITH WASHERS.

NOTE: 1

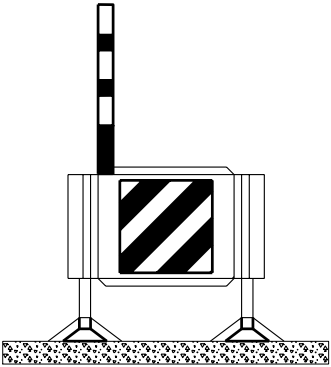
USE MARKER POST UNLESS OTHERWISE SPECIFIED. USE IS OPTIONAL WHEN SNOW ACCUMULATION IS NOT A CONCERN.

NOTE: 2

SHEETING TO COMPLY WITH UDOT STANDARD SPECIFICATION 02842 FOR FLEXIBLE SHEETING.



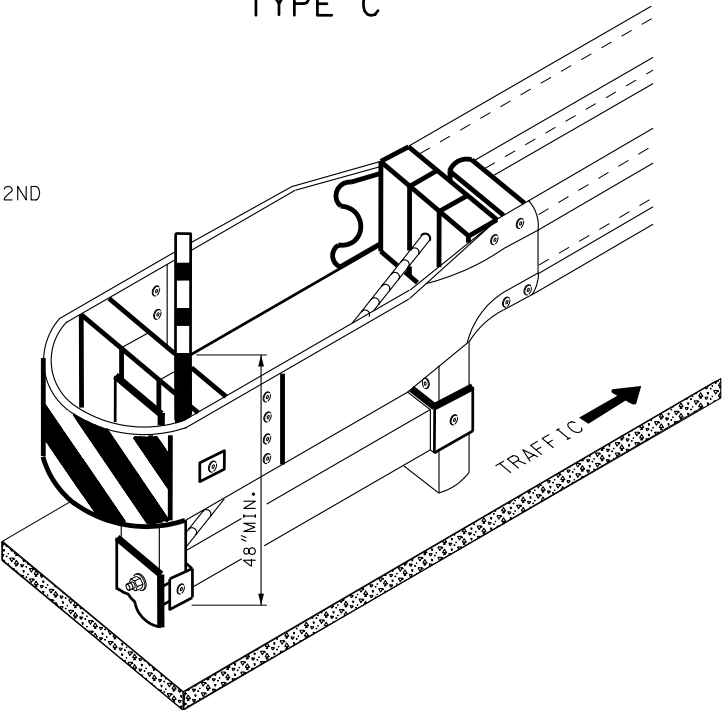
MARKER POST



OBJECT MARKER PLATE OR SHEETING: ATTACH TO THE TOP FRONT AND SIDE OF UNIT NEAREST THE APPROACH LANE OF TRAFFIC. IN A GORE AREA CENTER OBJECT MARKER.

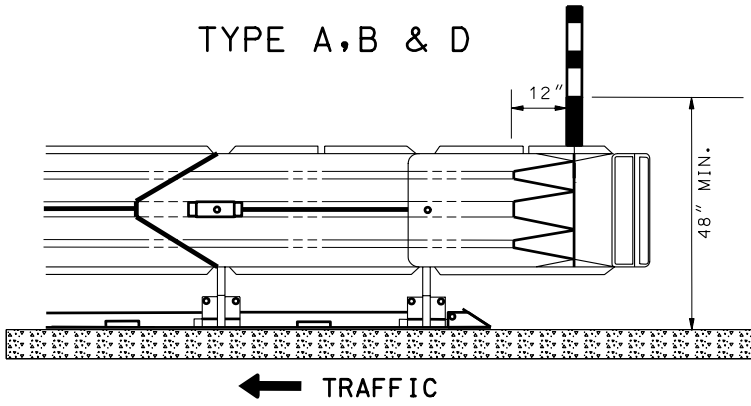
* APPROVED SYSTEM TYPE D, REACT-350 HAS AN OBJECT MARKER SUPPLIED WITH THE SYSTEM, MARKER POST IS NOT REQUIRED.

TYPE C



OBJECT MARKER PLATE OR SHEETING: ATTACH TO THE FRONT OF SYSTEM TOP, AND OFFSET 6 INCHES FROM CENTER TOWARD THE APPROACH LANE OF TRAFFIC.

TYPE A,B & D



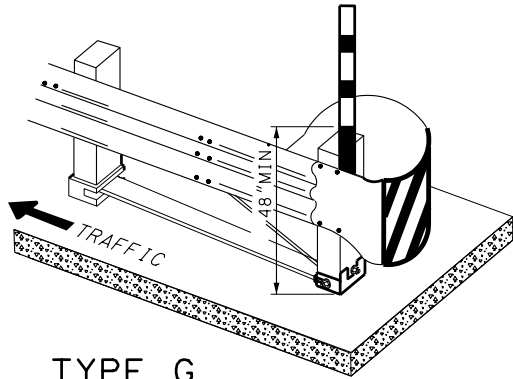
MARKER POST:

MOUNT ON THE SIDE OF THE APPROACH TRAFFIC, 12 INCHES FROM THE BACK EDGE OF PLASTIC NOSE PIECE. IN GORE AREAS MOUNT ON BOTH SIDES.

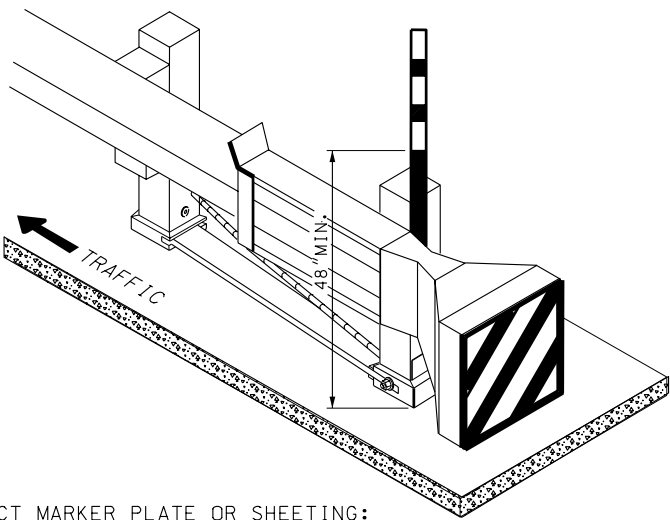
CRASH CUSHION TYPE F.

THIS SYSTEM HAS A BELTED OR PLASTIC NOSE PIECE AND STEEL POSTS. OBJECT MARKER MOUNTING SIMILAR TO TYPE H AND MARKER POST IS MOUNTED ON THE NOSE PIECE SIMILAR TO TYPE B.

TYPE H



TYPE G



OBJECT MARKER PLATE OR SHEETING: PLACE THE APPROPRIATE OBJECT MARKER PANEL TO THE FRONT OF THE SYSTEMS.

REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

RECOMMENDED FOR APPROVAL
SALESMAN
JAN.01.2005
DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED
JAN.01.2005
DATE
DEPUTY DIRECTOR

CRASH CUSHION
MARKINGS

STD DWG
CC 1

STANDARD DRAWING TITLE

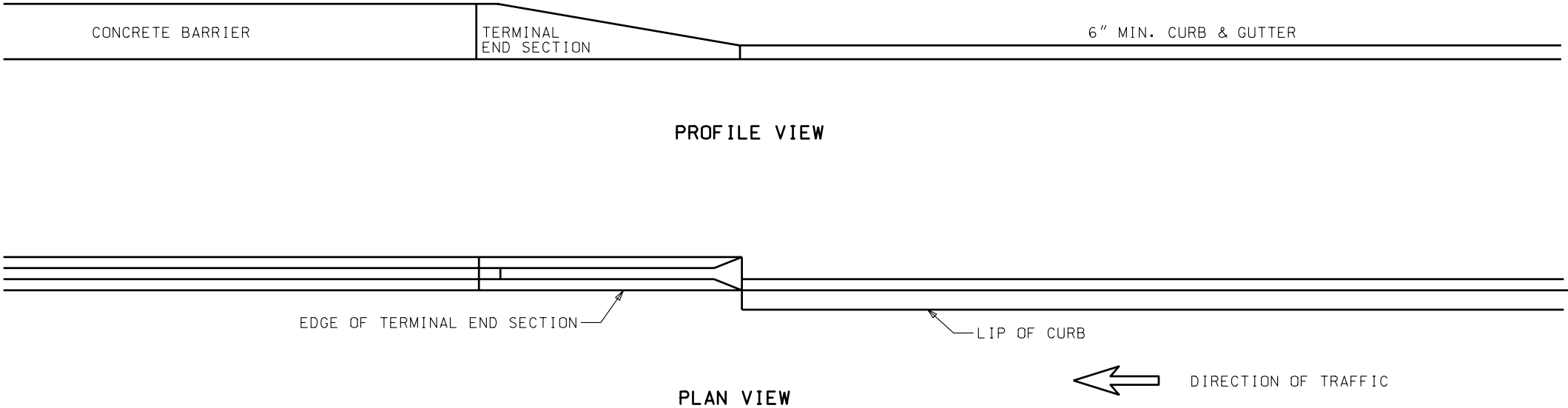
REMARKS

APPR.

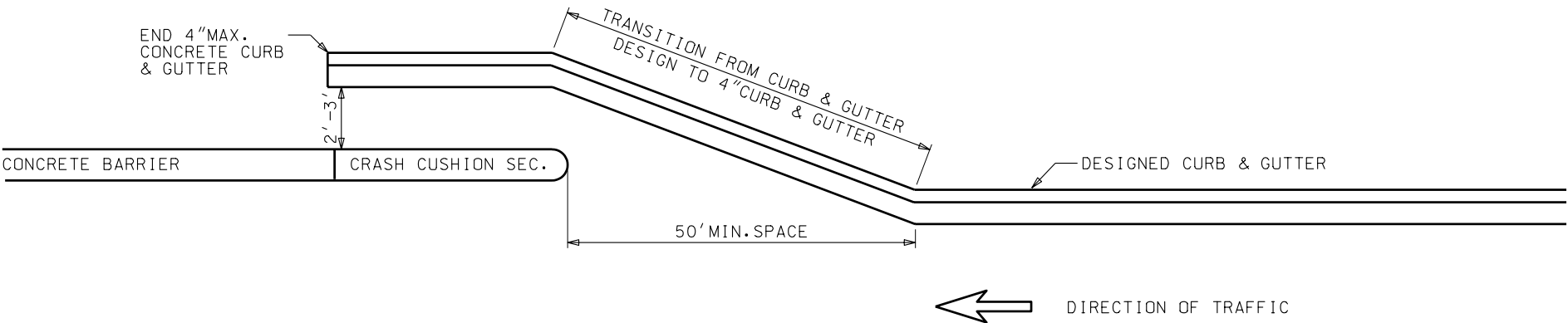
DATE

NO.

PLAN A1: SPEEDS UP TO 40 MPH



PLAN A2: SPEEDS OVER 40 MPH



UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

SALT LAKE COUNTY

RECOMMENDED FOR APPROVAL

CHAIRMAN STANDARDS COMMITTEE

APPROVED

DEPUTY DIRECTOR

CRASH CUSHION
DRAINAGE DETAILS
GUIDELINE A

STANDARD DRAWING TITLE

STD DWG
CC 2

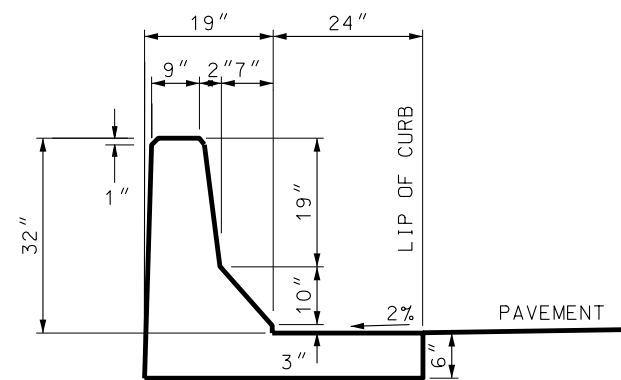
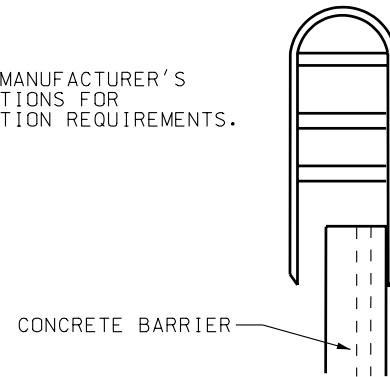
REVISIONS

NO. DATE APPR. REMARKS

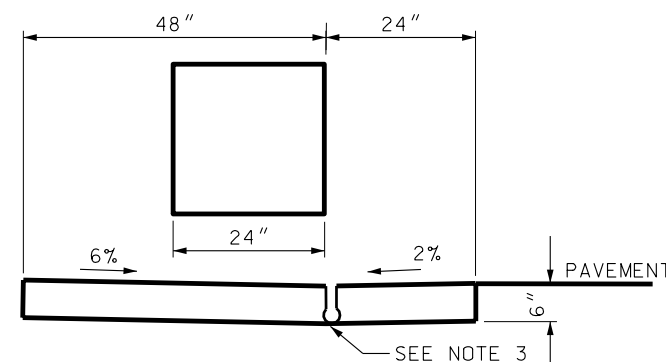
CRASH CUSHION CONNECTION

NOTE:

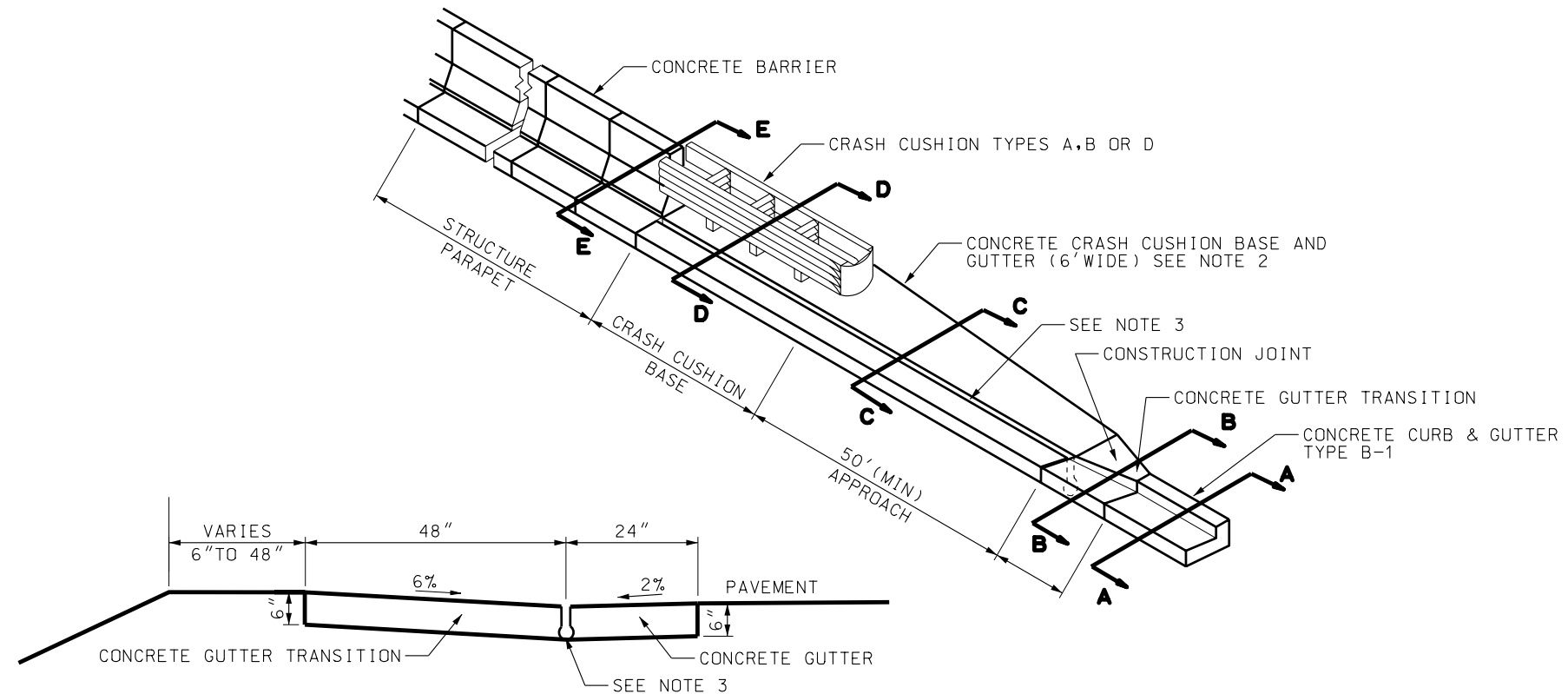
REFER TO MANUFACTURER'S
SPECIFICATIONS FOR
CERTIFICATION REQUIREMENTS.



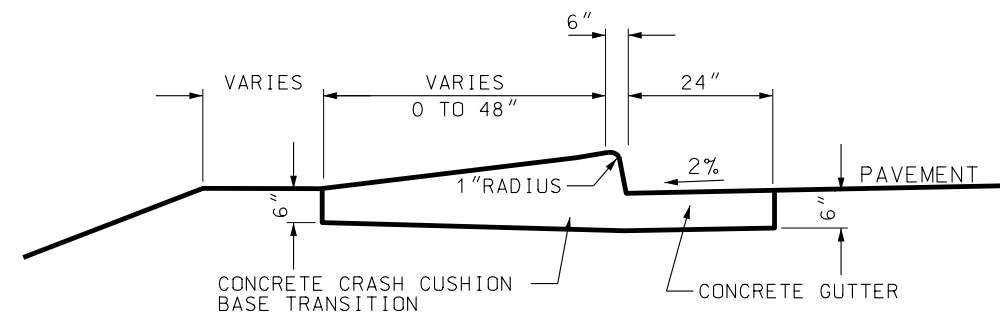
SECTION E-E



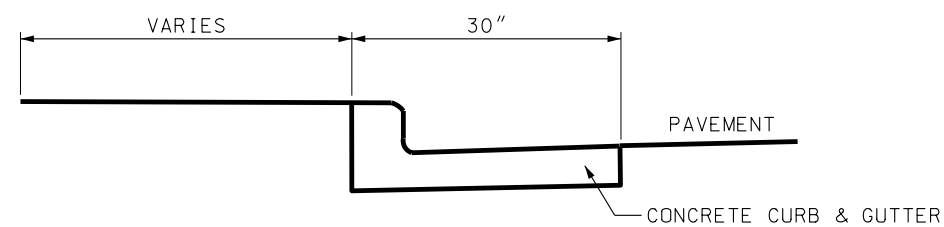
SECTION D-D



SECTION C-C



SECTION B-B



SECTION A-A

NOTES:

1. ALTERNATIVE INSTALLATION TO GUIDELINES A PLAN 2A STD DWG CC 2, FOR CRASH CUSHION TYPES A, B & D.
2. DESIGN A DRAINAGE SYSTEM THAT DOES NOT CREATE A RAISED CURB IN FRONT OF OR TO THE SIDES OF THE CRASH CUSHION SYSTEM WHEN PARALLEL ROAD SYSTEM IS 1 PERCENT OR GREATER. A SLOTTED DRAINAGE SYSTEM IS AN OPTION.
3. CAST, IN A MONOLITHIC POUR, CRASH CUSHION BASE AND GUTTER FROM REAR OF SYSTEM TO THE APPROACH TRANSITION WITH CURB AND GUTTER.

[illegible]

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALES PRICE: \$10.00

RECOMMENDED FOR APPROVAL _____ JAN.01,2005
DATE

CHAIRMAN STANDARDS COMMITTEE _____ JAN.01,2005
DATE

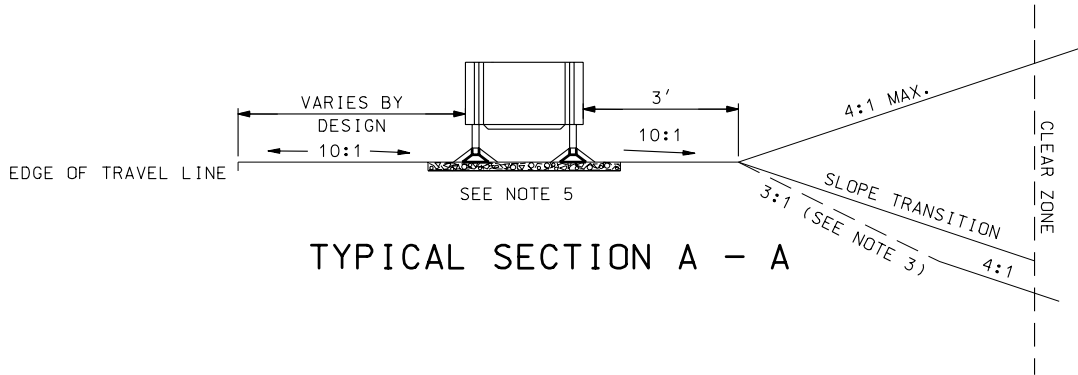
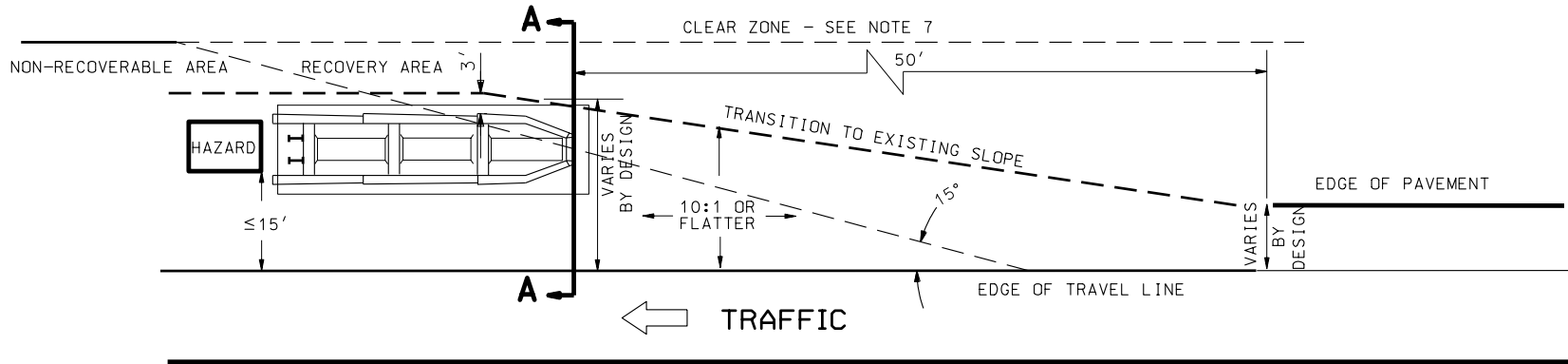
DEPUTY DIRECTOR _____

CRASH CUSHION DRAINAGE DETAILS GUIDELINE B

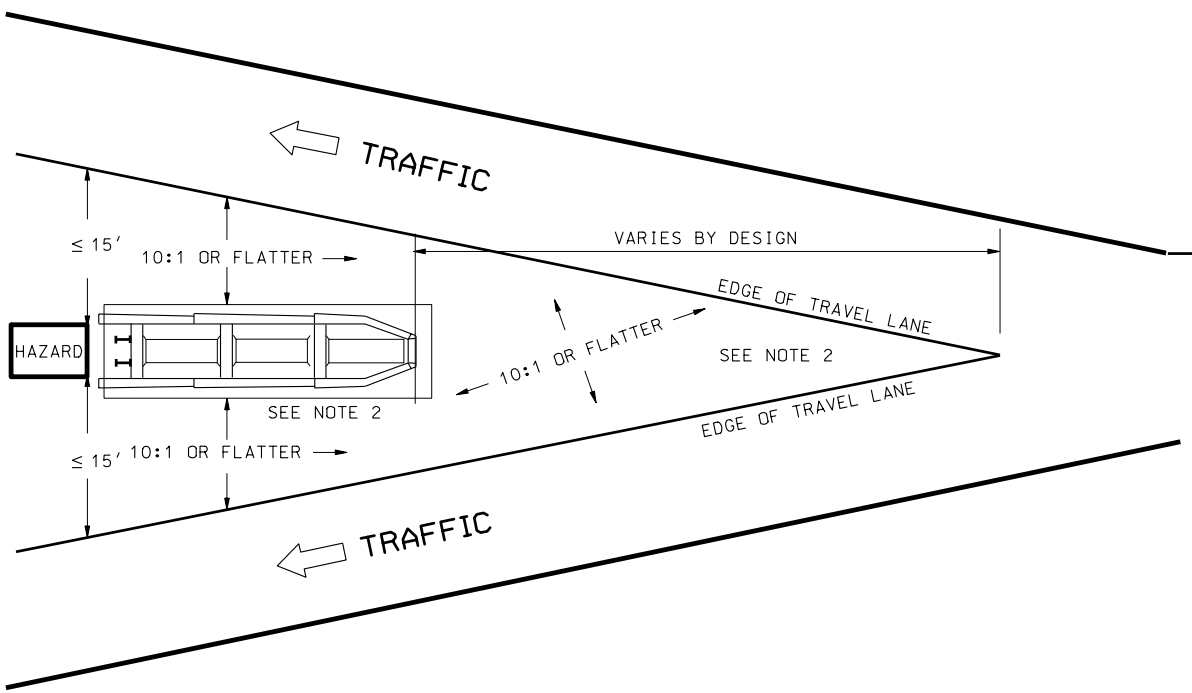
STANDARD DRAWING TITLE

STD DWG
CC 3

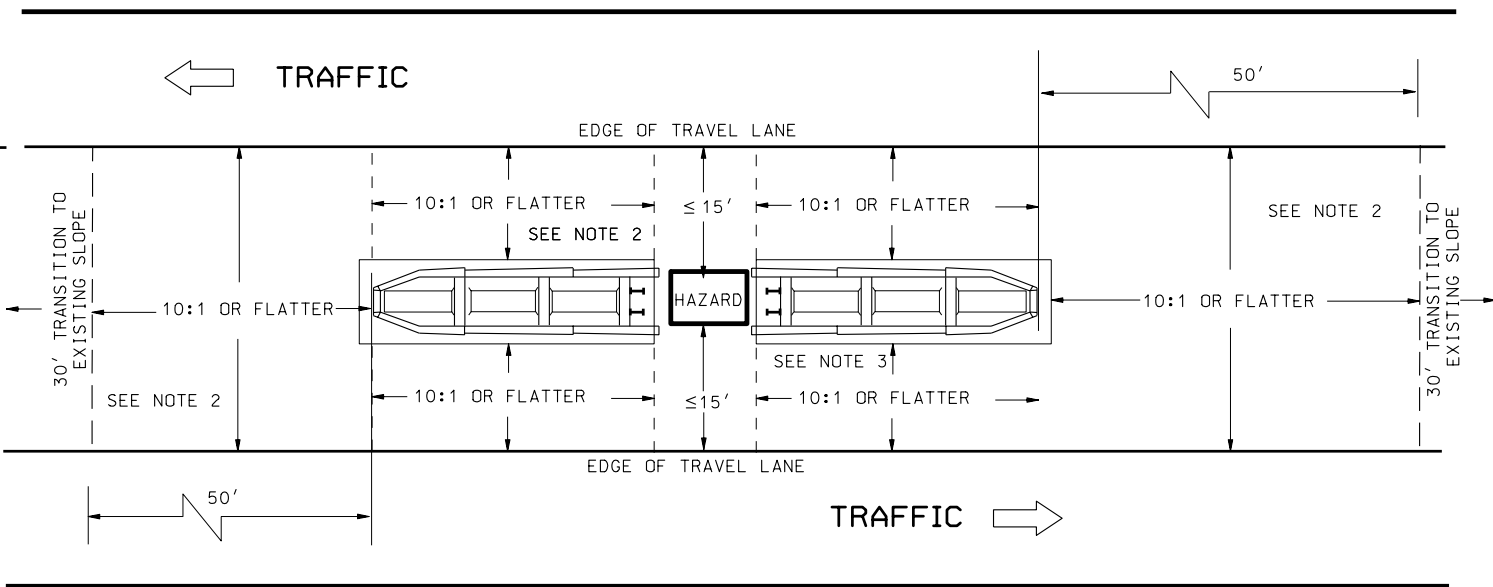
SHOULDER APPLICATION



GORE APPLICATION AREA



MEDIAN APPLICATION



NOTES:

1. CRASH CUSHION TYPE A: QUADGUARD, MANUFACTURED BY ENERGY ABSORPTION SYSTEMS, TO PROTECT HAZARDS FROM 37 INCHES TO 90 INCHES.

CRASH CUSHION TYPE B: QUADGUARD, MANUFACTURED BY ENERGY ABSORPTION SYSTEMS, TO PROTECT HAZARDS UP TO 36 INCHES.

CRASH CUSHION TYPE D: QUADGUARD ELITE AND QUADGUARD LMC,
MANUFACTURED BY ENERGY ABSORPTION SYSTEMS, AND REACT 350,
MANUFACTURED BY ROADWAY SAFETY SERVICES.
TYPE D SYSTEMS PROTECT HAZARDS UP TO 90 INCHES IN WIDTH.
TYPE D SYSTEMS ARE USED WHERE ONE OR MORE
IMPACTS PER YEAR ARE ANTICIPATED, OR WHEN REPAIR HISTORY
INDICATES TWO OR MORE IMPACTS OVER A THREE YEAR PERIOD.

2. ALL APPLICATIONS REQUIRE THE USE OF A 10:1 SLOPE OR FLATTER TO THE FRONT AND SIDE APPROACHES. USE A 10:2 OR FLATTER SLOPE AT THE REAR OF THE SYSTEM WHEN TRAFFIC ALSO APPROACHES FROM THE REAR OF THE SYSTEM.
3. USE A 4:1 OR FLATTER FILL SLOPE AND A RECOVERY AREA IF IMPRACTICAL, USE A MAXIMUM 3:1 FILL SLOPE AND A RECOVERY AREA ESTABLISHED AT THE TOE OF 3:1 FILL SLOPE. WHEN USED WITH A CUT SLOPE, A 4:1 OR FLATTER CUT IS REQUIRED IN THE RECOVERY AREA.
4. USE A TRANSITION ELEMENT, AS PER MANUFACTURER'S SPECIFICATIONS, WHEN TRAFFIC APPROACHES THE REAR OF SYSTEM.
5. USE MANUFACTURER'S SPECIFICATIONS FOR PAD AND BACKUP REQUIREMENTS.
6. INSTALL PROPER MARKINGS AS PER STD DWG CC 1.
7. MAINTAIN AASHTO CLEAR ZONE REQUIREMENTS.

[illegible]

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

RECOMMENDED FOR APPROVAL _____
CHAIRMAN STANDARDS COMMITTEE _____
DATE JAN. 01, 2005

DATE

JAN.01.2005

DATE

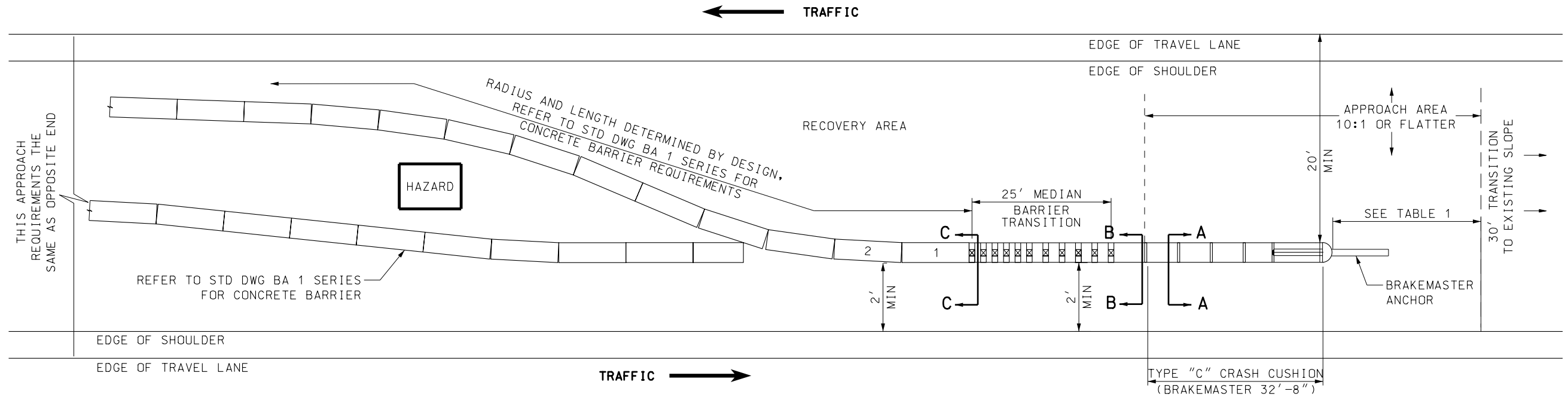
DEPUTY DIRECTOR

DETAILS FOR PLACEMENT CRASH CUSHIONS TYPE A, B, AND D

STANDARD DRAWING TITLE

STD DWG
CC 4

10-NOV-2005 DGN File: L:\Standard Drawings\Imperial\2005\Approved\Change5\Approved\CC5A.dgn



TRAFFIC →

CONCRETE BARRIER INSTALLATION DETAIL

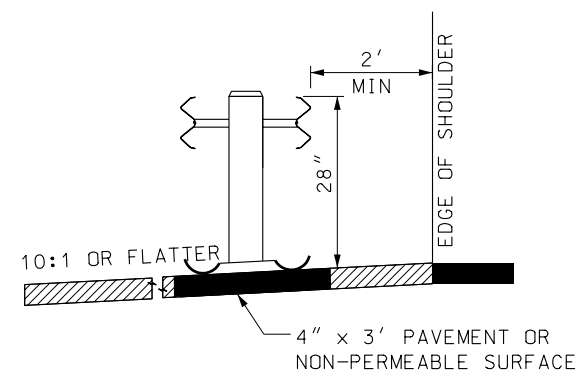
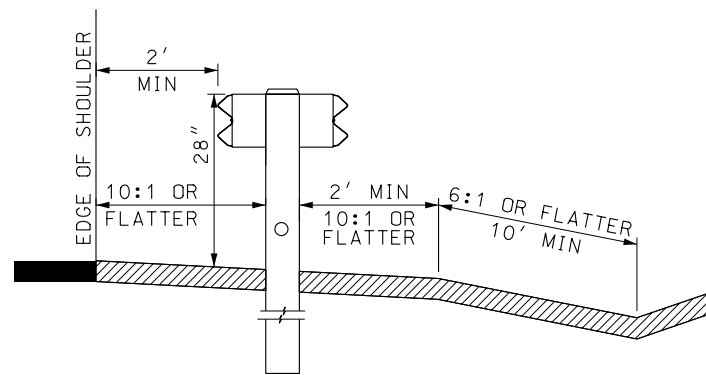
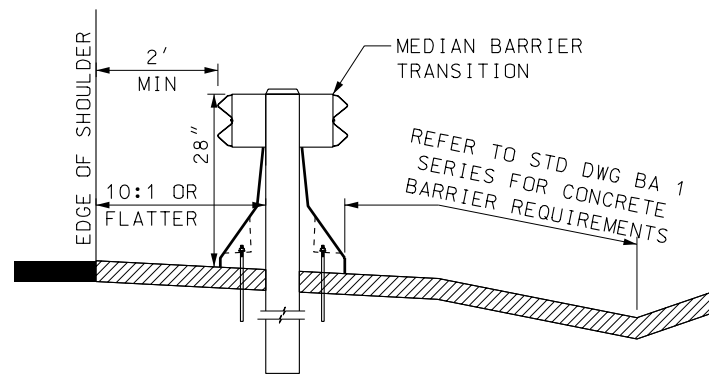
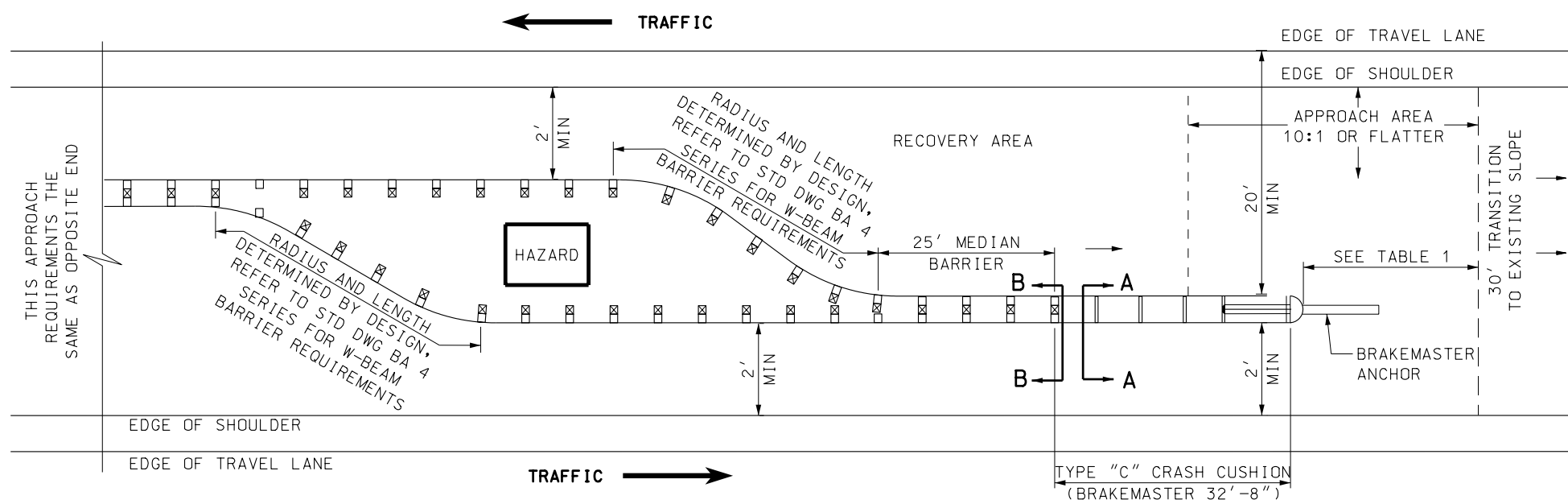


TABLE 1	
SPEED MPH	MINIMUM LENGTH FEET
LESS THAN 40	70
40 TO 55	100
60 TO 75	150

W-BEAM GUARDRAIL BARRIER INSTALLATION DETAIL



NOTES:

1. THE BRAKEMASTER, MANUFACTURED BY ENERGY ABSORPTION SYSTEM. SEE UDOT'S GUIDELINES FOR SPECIFIC SYSTEM DETAILS.
2. INSTALL SYSTEMS AS PER UDOT'S AND MANUFACTURER'S SPECIFICATIONS.
3. HAVE SHOP DRAWING AVAILABLE ON SITE FOR REFERENCE DURING INSTALLATION.
4. USE 4" NON-PERMEABLE OR PAVED SURFACE FOR BRAKEMASTER SYSTEMS.
5. COMPLETE SLOPE PREPARATION PRIOR TO INSTALLING SYSTEM.
6. CLEAR RECOVERY AND APPROACH AREAS OF ANY FIXED OBJECTS. DO NOT PLACE SIGNS OR POLES IN APPROACH AREA. SIGNS OR POLES PLACED IN THE RECOVERY AREA WILL BE BREAKAWAY AND BE A MINIMUM 10 FEET FROM SYSTEM RAIL ELEMENTS.
7. INSTALL REQUIRED MARKINGS AS PER STD DWG CC 1.

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

RECOMMENDED FOR APPROVAL

CHAIRMAN STANDARDS COMMITTEE

APPROVED

GRADING AND PLACEMENT DETAILS

CRASH CUSHION TYPE C

BRAKEMASTER

STANDARD DRAWING TITLE

REVISIONS		NO.	DATE	APPR.	REMARKS
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OCT.27,2005

OCT.27,2005

DATE

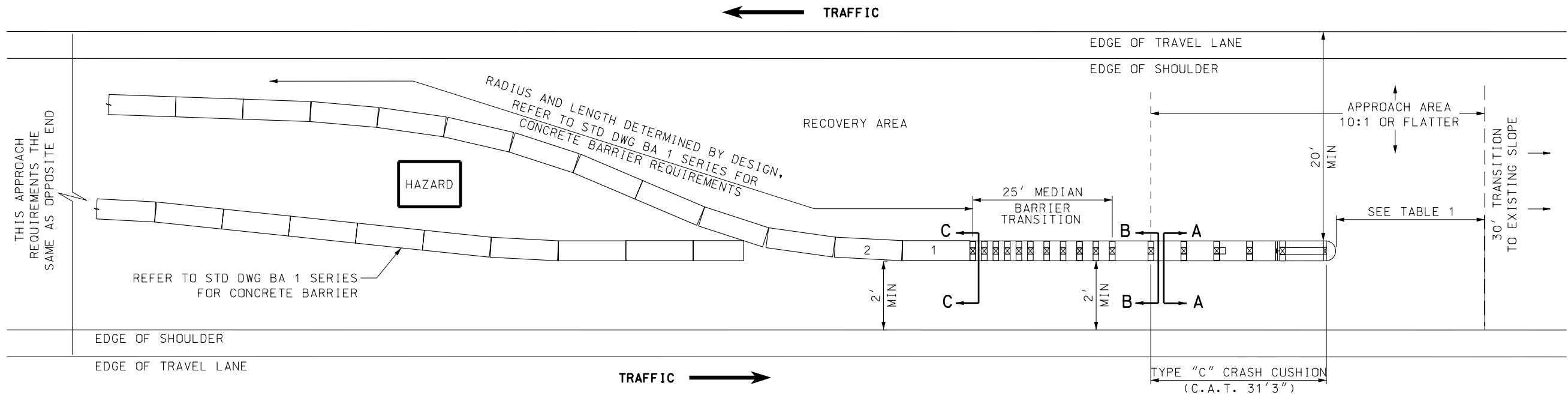
DATE

DEPUTY DIRECTOR

STD DWG

CC 5A

10-NOV-2005 DGN File: L:\Standard Drawings\Internal\2005\Approved\Change5\Approved\CC05B.dgn



TRAFFIC →

CONCRETE BARRIER INSTALLATION DETAIL

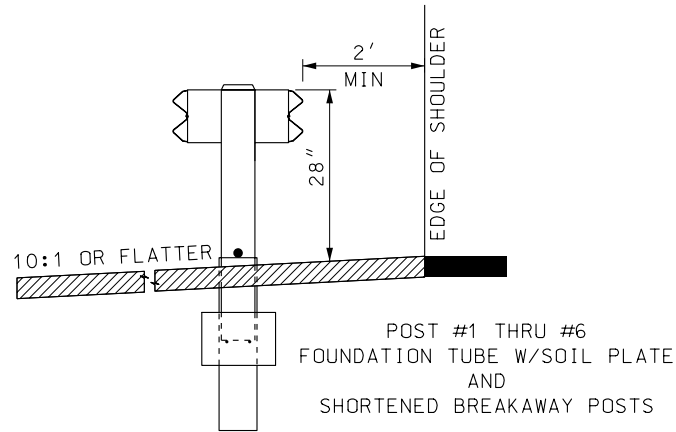
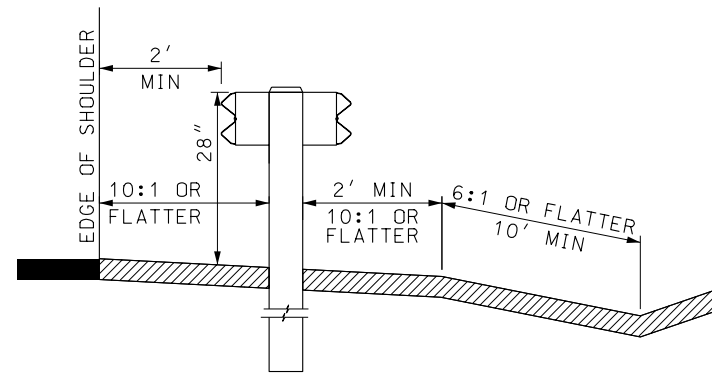
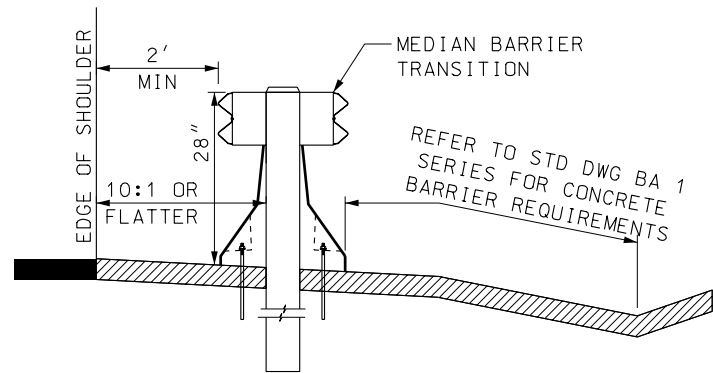
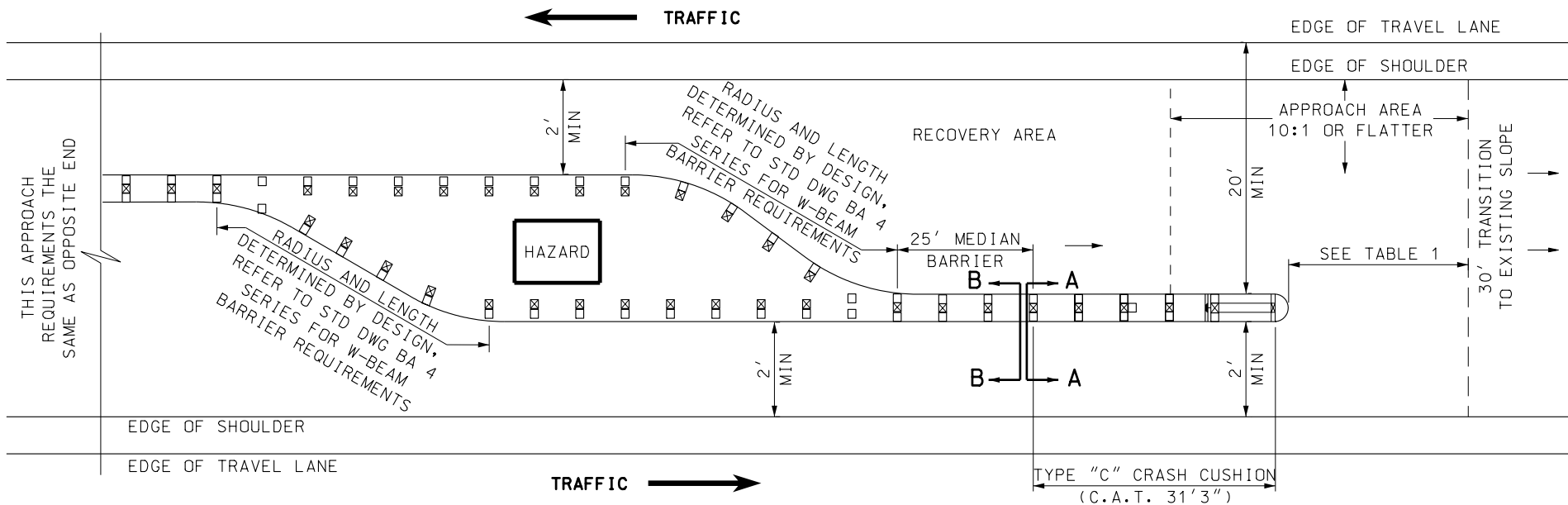


TABLE 1	
SPEED MPH	MINIMUM LENGTH FEET
LESS THAN 40	70
40 TO 55	100
60 TO 75	150

W-BEAM GUARDRAIL BARRIER INSTALLATION DETAIL



NOTES:

1. THE C.A.T., MANUFACTURED BY TRINITY INDUSTRIES. SEE UDOT'S GUIDELINES FOR CRASH CUSHIONS FOR SPECIFIC SYSTEM DETAILS.
2. INSTALL SYSTEMS AS PER UDOT'S AND MANUFACTURER'S SPECIFICATIONS.
3. HAVE SHOP DRAWING AVAILABLE ON SITE FOR REFERENCE DURING INSTALLATION.
4. USE GRADED AND COMPACTED SURFACE FOR C.A.T. SYSTEMS.
5. COMPLETE SLOPE PREPARATION PRIOR TO INSTALLING SYSTEM.
6. CLEAR RECOVERY AND APPROACH AREAS OF ANY FIXED OBJECTS. DO NOT PLACE SIGNS OR POLES IN APPROACH AREA. SIGNS OR POLES PLACED IN THE RECOVERY AREA WILL BE BREAKAWAY AND BE A MINIMUM 10 FEET FROM SYSTEM RAIL ELEMENTS.
7. INSTALL REQUIRED MARKINGS AS PER STD DWG CC 1.

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

SALT LAKE CITY

GRADING AND
PLACEMENT DETAILS
CRASH CUSHION
TYPE C
C.A.T.

STD DWG
CC 5B

REVISIONS		NO.	DATE	APPR.	REMARKS
1	10-27-05	GS			NEW DRAWING, REPLACES CC 5 WITH CC 5A, 5B, AND 5C.

RECOMMENDED FOR APPROVAL

CHAIRMAN STANDARDS COMMITTEE

DEPUTY DIRECTOR

OCT. 27, 2005

OCT. 27, 2005

10-NOV-2005 DGN File: L:\Standard Drawings\Internal\2005\Approved\Change5\Approved\CC05C.dgn

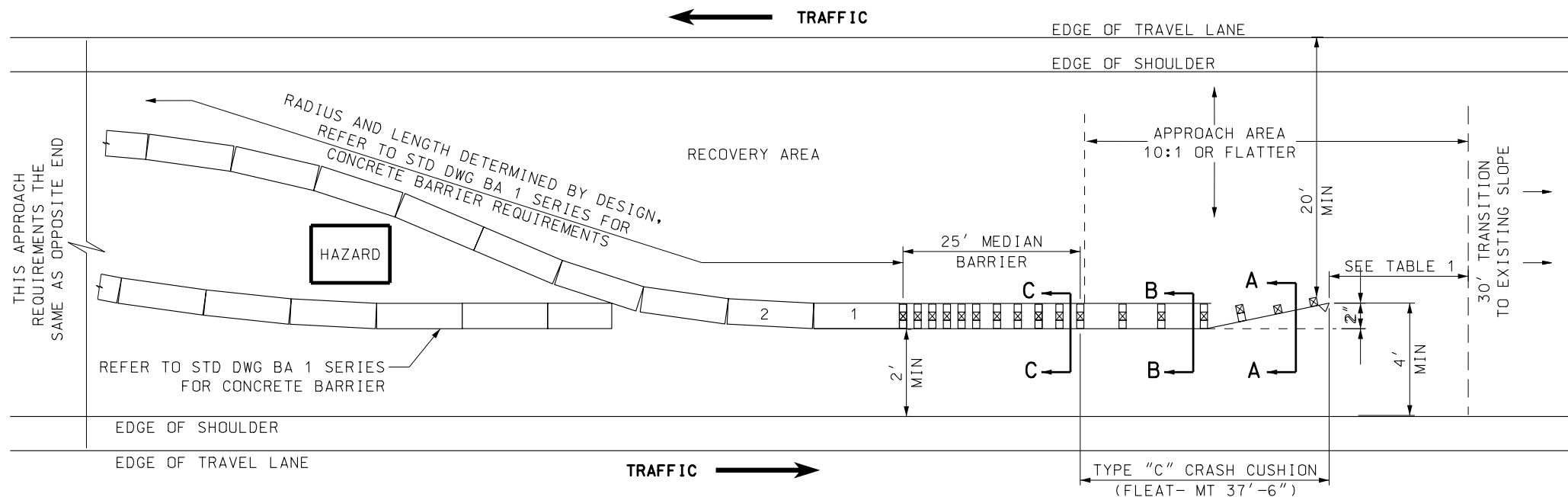
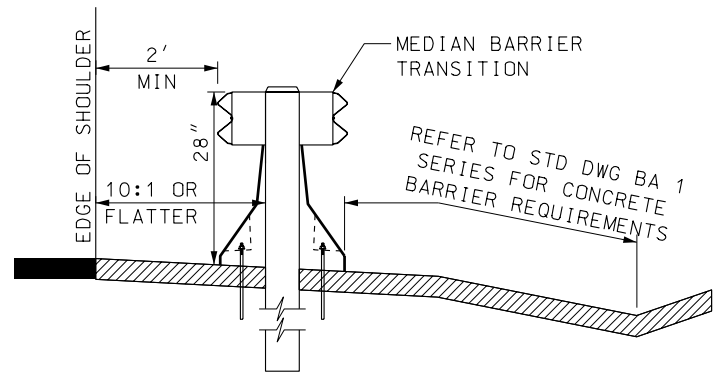


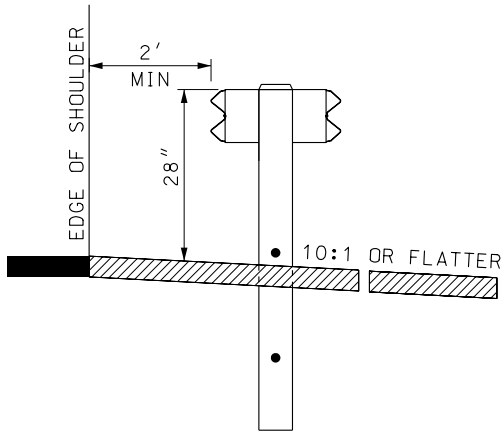
TABLE 1	
SPEED MPH	MINIMUM LENGTH FEET
LESS THAN 40	70
40 TO 55	100
60 TO 75	150

CONCRETE BARRIER INSTALLATION DETAIL



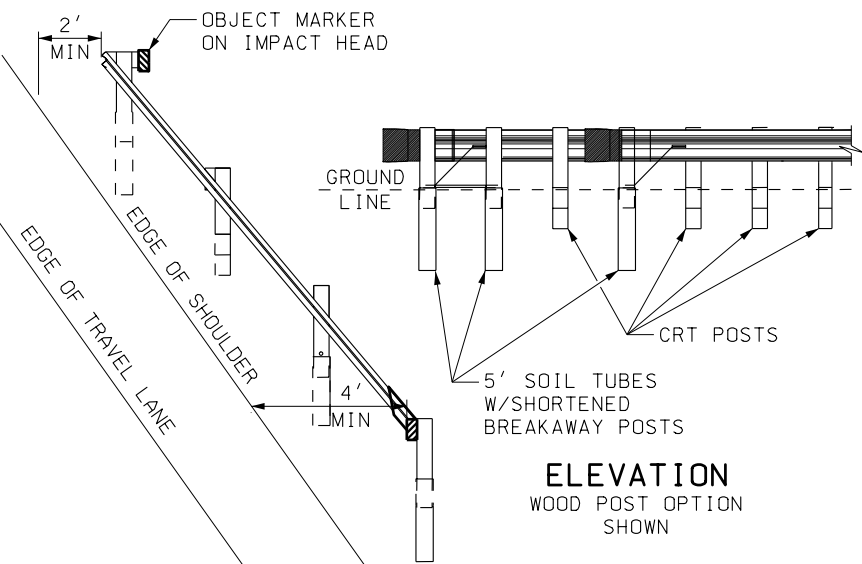
SECTION C-C

PIN BARRIER SECTION 1 AND 2 WITH STABILIZATION PINS



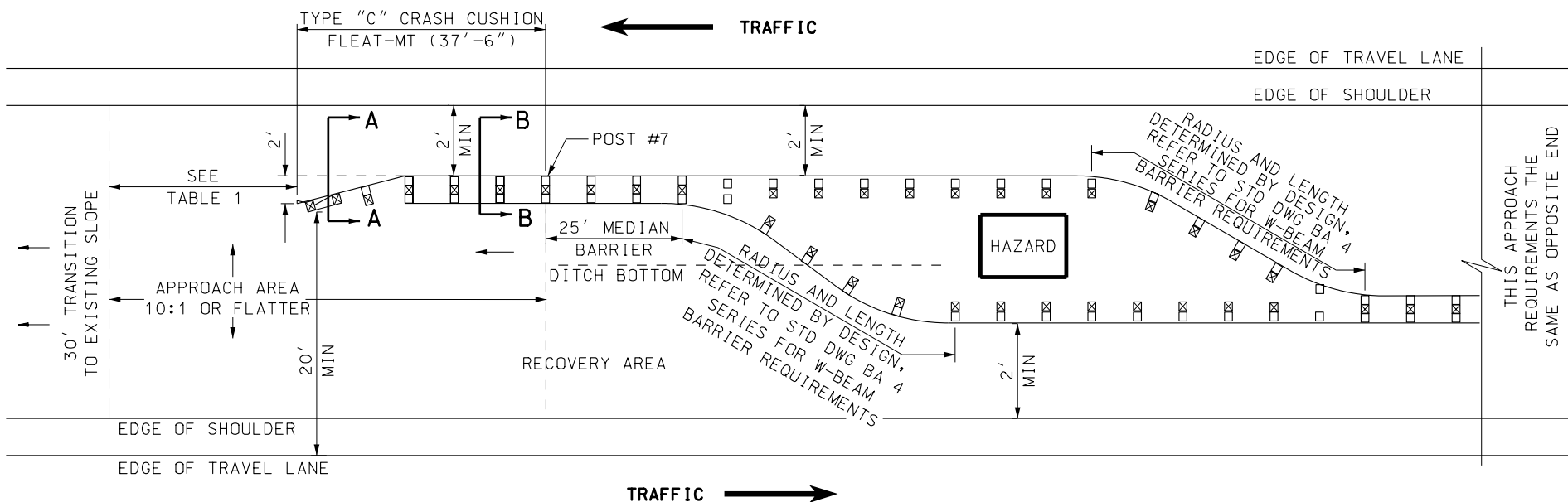
SECTION B-B

DRILL 2" HOLES IN MEDIAN BARRIER TRANSITION OR MEDIAN BARRIER AS SPECIFIED BY MANUFACTURER



SECTION A-A

W-BEAM GUARDRAIL BARRIER INSTALLATION DETAIL



NOTES:

1. THE FLEAT-MT, MANUFACTURED BY ROAD SYSTEMS INC. SEE UDOT'S GUIDELINES FOR SPECIFIC SYSTEM DETAILS.
2. INSTALL SYSTEMS AS PER UDOT'S AND MANUFACTURER'S SPECIFICATIONS.
3. REFER TO UDOT'S GUIDELINES FOR CRASH CUSHIONS FOR APPROVED POST OPTIONS.
4. HAVE SHOP DRAWING AVAILABLE ON SITE FOR REFERENCE DURING INSTALLATION.
5. USE GRADED AND COMPACT SURFACE FOR FLEAT-MT SYSTEMS.
6. COMPLETE SLOPE PREPARATION PRIOR TO INSTALLING SYSTEM.
7. CLEAR RECOVERY AND APPROACH AREAS OF ANY FIXED OBJECTS. DO NOT PLACE SIGNS OR POLES IN APPROACH AREA. SIGNS OR POLES PLACED IN THE RECOVERY AREA WILL BE BREAKAWAY AND BE A MINIMUM 10 FEET FROM SYSTEM RAIL ELEMENTS.
8. INSTALL REQUIRED MARKINGS AS PER STD DWG CC 1 AND THIS DRAWING.

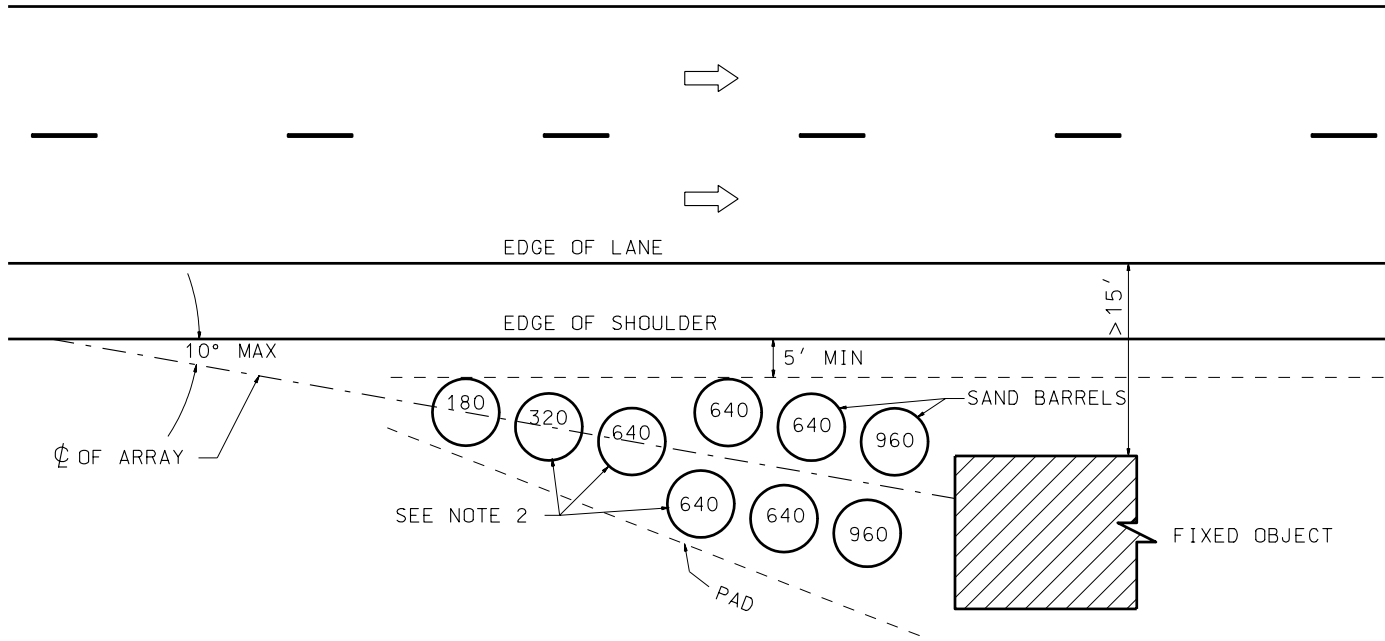
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

GRADING AND
PLACEMENT DETAILS
CRASH CUSHION
TYPE C
FLEAT-MT

STD DWG
CC 5C

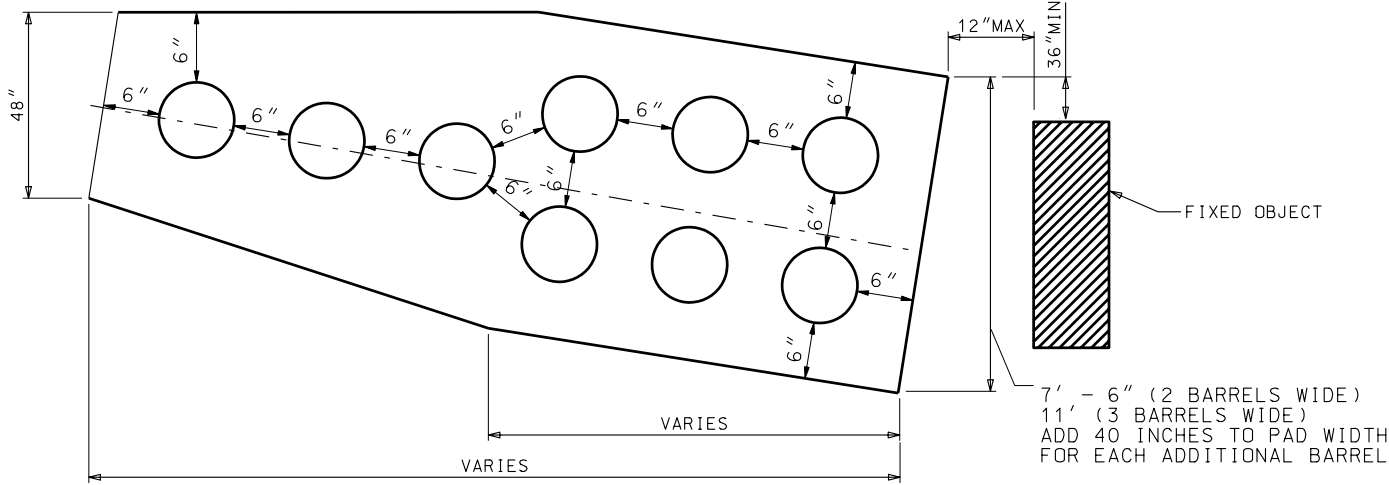
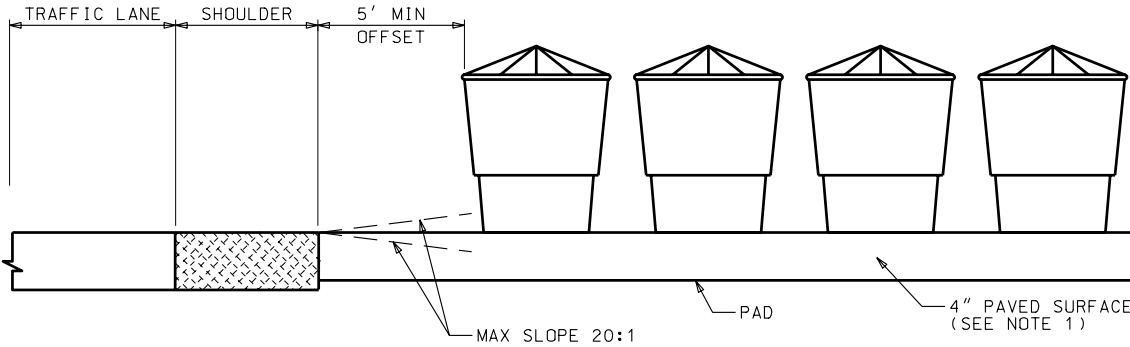
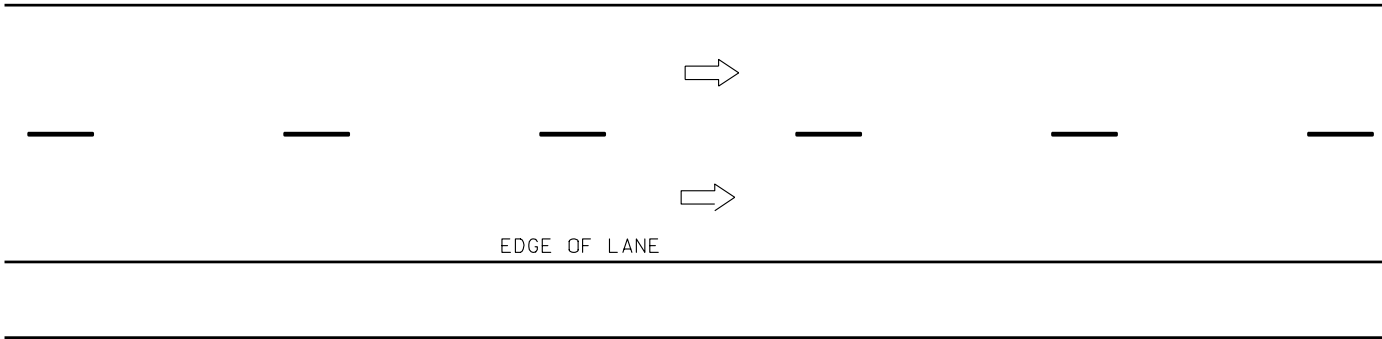
REVISIONS		NO.	DATE	APPR.	REMARKS
1	10-27-05	GS			NEW DRAWING, REPLACES CC 5 WITH CC 5A, 5B, AND 5C.

RECOMMENDED FOR APPROVAL	OCT. 27, 2005	DATE
CHAIRMAN STANDARDS COMMITTEE	OCT. 27, 2005	DATE
DEPUTY DIRECTOR		



FOR ILLUSTRATION ONLY
ACTUAL DESIGNS WILL BE SITE SPECIFIC
SEE NOTE 3

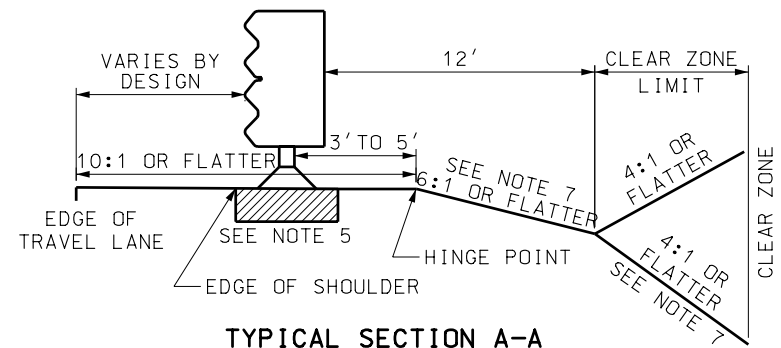
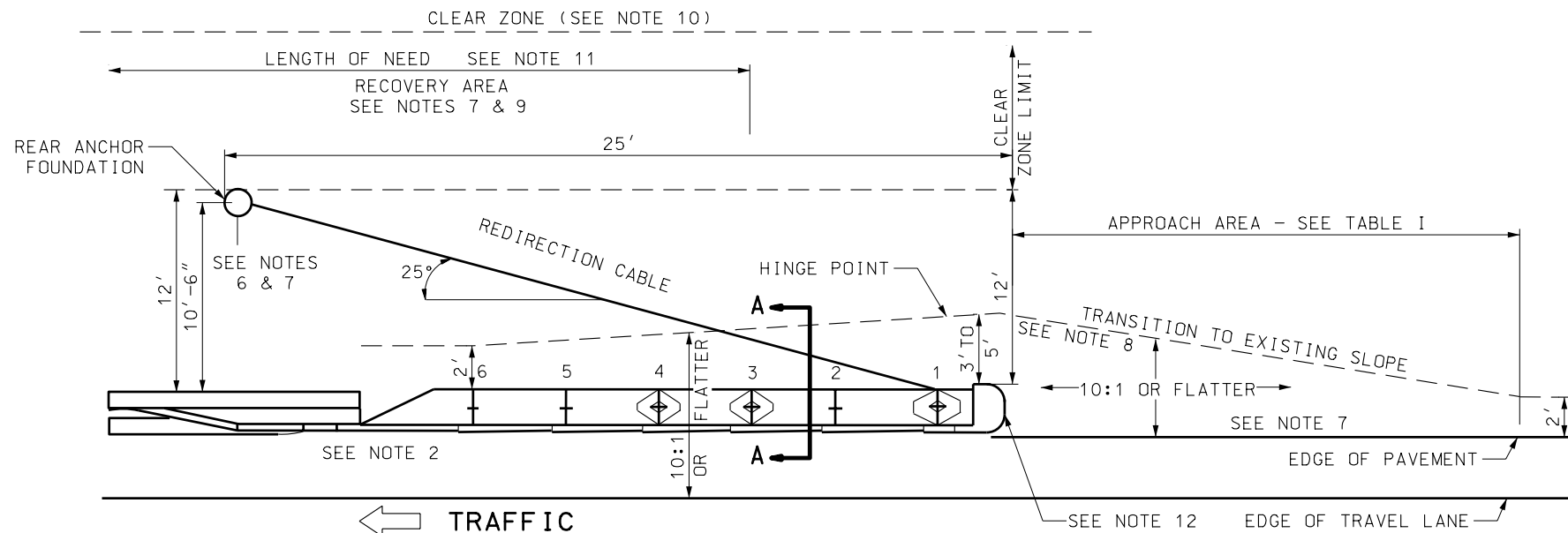
- NOTES:**
1. PAVE PAD WITH HOT MIX ASPHALT OR PORTLAND CEMENT CONCRETE.
 2. MARK BARREL POSITION AND THE REQUIRED SAND WEIGHT FOR EACH BARREL POSITION ON THE PAVED SURFACE. USE FLUORESCENT ORANGE FOR THIS MARKING.
 3. USE ENERGITE III SYSTEMS MANUAL TO GET REQUIRED DESIGN CRITERIA. MANUAL AVAILABLE FROM THE DIVISION OF TRAFFIC AND SAFETY.
 4. INSTALL REQUIRED MARKING AS PER STD DWG CC 1



UTAH DEPARTMENT OF TRANSPORTATION		STANDARD DRAWING TITLE	
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION		CRASH CUSHION TYPE E SAND BARREL DETAILS	
RECOMMENDED FOR APPROVAL		STD DWG	
CHAIRMAN STANDARDS COMMITTEE		CC 6	
APPROVED		REVISIONS	
DEPUTY DIRECTOR		NO.	
DATE		DATE	
JAN.01.2005		APPR.	
JAN.01.2005		REMARKS	

14-MAR-2005 DGN: F:\et\N\etad\Standard Drawings\Imperial\2005\Approved\ChangelApproved\CC07A.dgn

CRASH CUSHION TYPE F

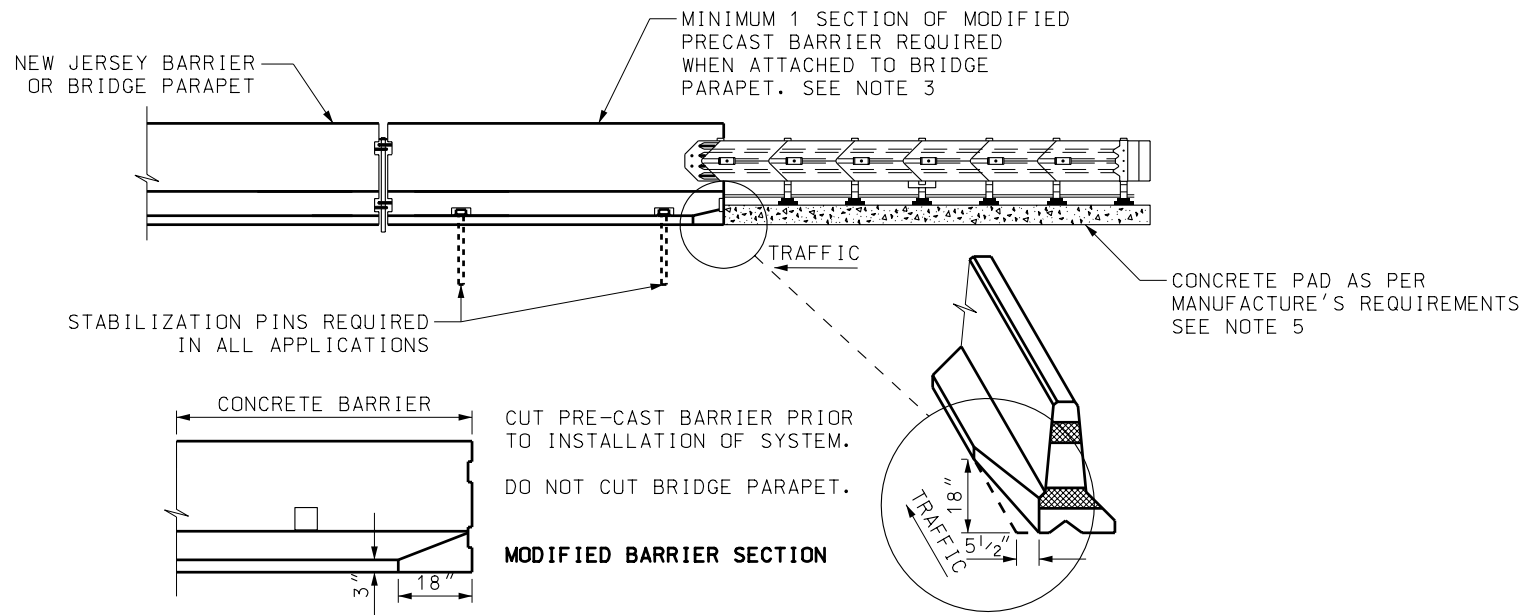


TYPICAL SECTION A-A

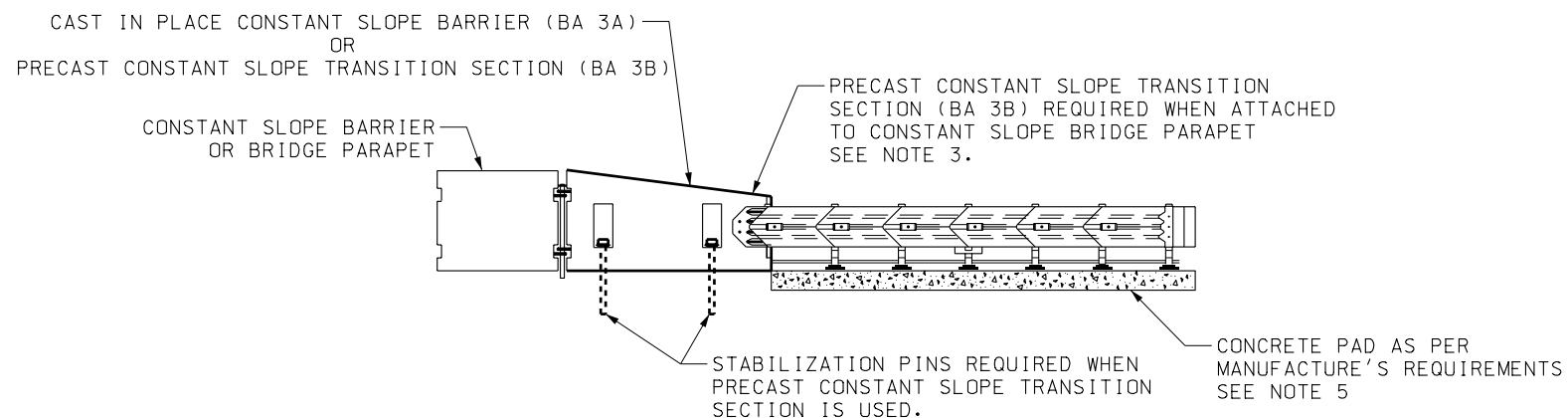
TABLE 1	
SPEED MPH	TAPER
LESS THAN 40	7:1
40 TO 55	10:1
60 TO 75	15:1

NOTES FOR CRASH CUSHION TYPE F

1. THE QUADTREND-350 IS MANUFACTURED BY ENERGY ABSORPTION SYSTEMS, SEE UDOT'S GUIDELINES FOR CRASH CUSHIONS FOR SPECIFIC SYSTEM DETAILS.
2. USE SYSTEM WHEN DIRECT ATTACHMENT TO BARRIER IS REQUIRED AND THE LONGITUDINAL SPACE IN FRONT OF THE HAZARD IS EQUAL TO THE REQUIRED MINIMUM LENGTH AS STATED IN TABLE 1. INSTALL SYSTEM AS PER UDOT'S AND MANUFACTURER'S SPECIFICATIONS.
3. CUT PRE-CAST NEW JERSEY BARRIER AS PER DETAIL, PRIOR TO INSTALLATION OF SYSTEM. SEAL CUT WITH THE SAME TYPE OF SEALER USED ON BARRIER. DO NOT CUT BRIDGE PARAPET. INSTALL 1 SECTION OF A PRECAST BARRIER, CUT AS PER DETAIL. INSTALL STABILIZATION PINS IN BARRIER SECTION. CONSTANT SLOPE BARRIER OR CONSTANT SLOPE BARRIER TRANSITION DOES NOT NEED MODIFICATION. THE REQUIRED BARRIER SECTIONS ARE A SEPARATE PAY ITEM FROM THE CRASH CUSHION.
4. HAVE SHOP DRAWING AVAILABLE ON SITE FOR REFERENCE DURING INSTALLATION.
5. INSTALL CONCRETE PAD AS PER MANUFACTURER'S REQUIREMENTS.
6. PLACE CABLE ANCHOR FOUNDATION IN SUCH A MANNER THAT THE REDIRECTING CABLE LAYS 6:1 OR FLATTER ON TOP OF THE GROUND, AND THE FOUNDATION WITH THE CABLE ANCHOR BRACKET ATTACHED DOES NOT EXCEED 4 INCHES ABOVE GROUND LEVEL. DO NOT BURY REDIRECTION CABLE.
7. COMPLETE SLOPE PREPARATION PRIOR TO INSTALLING SYSTEM.
 - A. USE A 10:1 OR FLATTER SLOPE IN APPROACH AREA.
 - B. A FORESLOPE AREA OF 12 FOOT X 25 FOOT AT 6:1 OR FLATTER REQUIRED FOR REAR ANCHOR FOUNDATION INSTALLATION.
 - C. USE A 4:1 OR FLATTER FORESLOPE IN RECOVERY AREA, AFTER REAR ANCHOR SLOPES HAVE BEEN ESTABLISHED
 - 1) IF A 4:1 FORESLOPE IS IMPRACTICAL USE A MAXIMUM 3:1 FORESLOPE IN RECOVERY AREA. ESTABLISH RECOVERY AREA AT THE TOE OF THE 3:1 FORESLOPE OF 4:1 OR FLATTER.
 - D. USE OF 4:1 BACKSLOPE TO CLEAR ZONE LIMIT IN RECOVERY AREA PERMITTED ONLY AFTER THE REAR ANCHOR FORESLOPE S HAVE BEEN ESTABLISHED. IF A 4:1 BACKSLOPE IS IMPRACTICAL A 3:1 IS PERMITTED.
8. CONSTRUCT PLATFORM AS REQUIRED EVEN IF THE PLATFORM EXTENDS BEYOND THE CLEAR ZONE.
9. CLEAR THE RECOVERY AND APPROACH AREAS OF ANY FIXED OBJECTS.
 - A. DO NOT PLACE SIGNS OR POLES IN APPROACH AREA.
 - B. USE BREAKAWAY SIGNS OR POLES WHEN PLACED IN RECOVERY AREA. MAINTAIN A MINIMUM 10 FOOT CLEARANCE TO THE SIDES AND REAR OF SYSTEM.
10. ATTACH SAND CONTAINERS AT POSTS 1, 3 AND 4.
11. USE CURRENT EDITION OF ROADSIDE DESIGN GUIDE TO ESTABLISH CLEAR ZONE AND LENGTH OF NEED (LON) REQUIREMENTS.
12. INSTALL REQUIRED MARKING AS PER STD DWG CC 1.



USE THIS DETAIL WHEN SYSTEM IS INSTALLED WITH NEW JERSEY SHAPED BARRIER



USE THIS DETAIL WHEN SYSTEM IS INSTALLED WITH CONSTANT SLOPE BARRIER

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

RECOMMENDED FOR APPROVAL

CHAIRMAN STANDARDS COMMITTEE

APPROVED

DEPUTY DIRECTOR

GRADING AND INSTALLATION DETAILS

CRASH CUSHION

TYPE F

QUAD TREND 350

STANDARD DRAWING TITLE

STD DWG

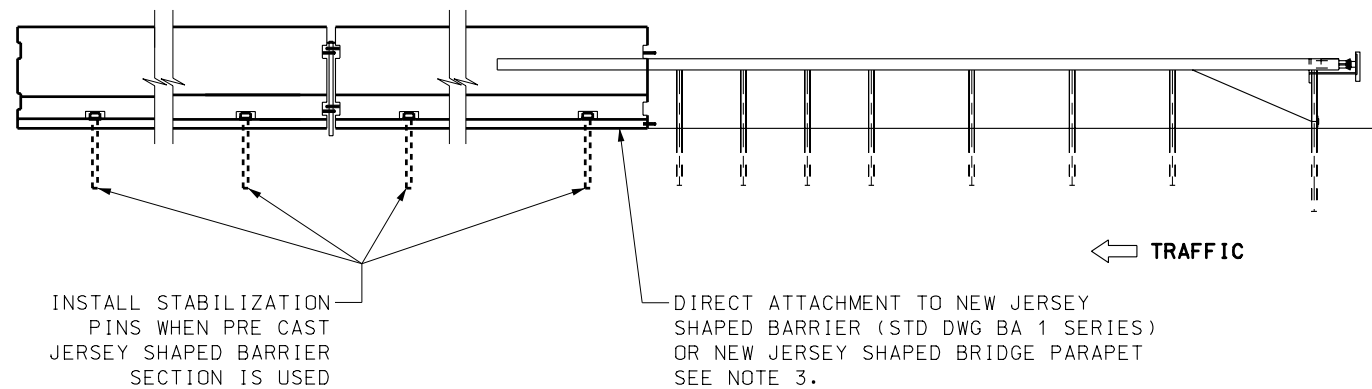
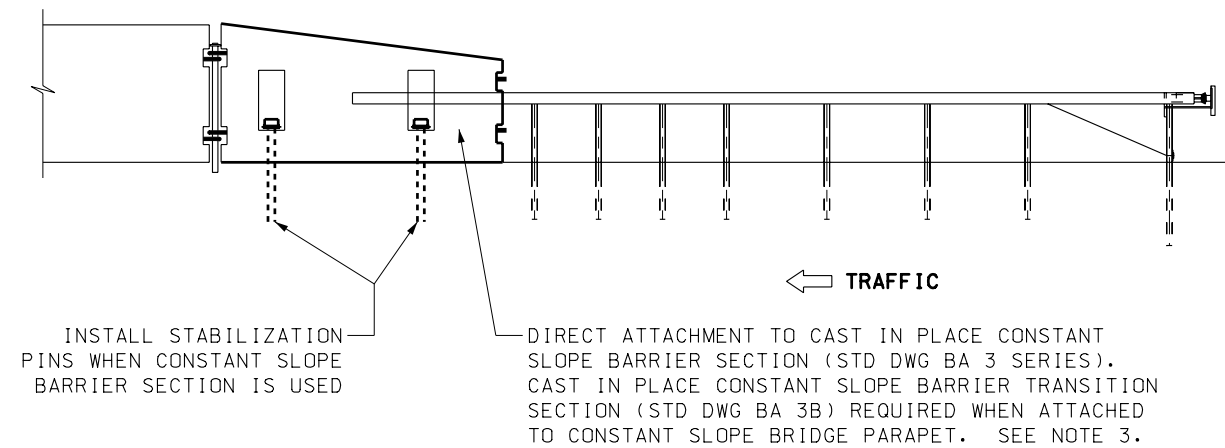
CC 7A

REVISIONS

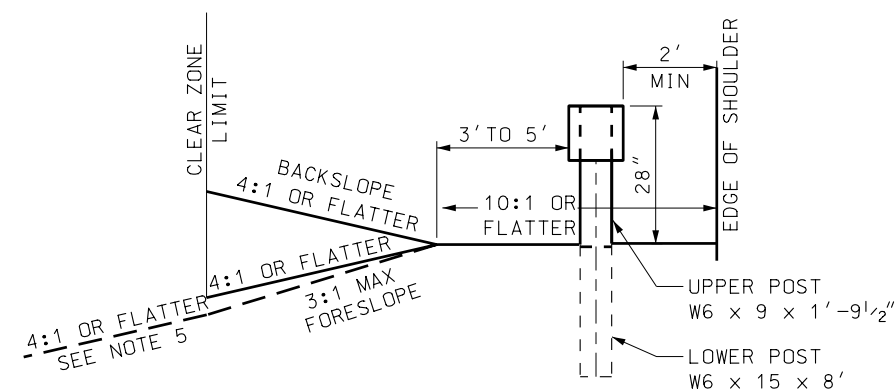
1 2-24-05 GS ADDED BARRIER MODIFICATION DETAILS, MODIFIED

RECOVERY AREA REQUIREMENTS, REVISED NOTES AND

TABLE 1. PREVIOUSLY CC 7.



DETAIL WHEN SYSTEM IS INSTALLED WITH CONSTANT SLOPE BARRIER
(GROUND MOUNTED POST SHOWN, SURFACE MOUNTED STEEL BREAKAWAY POST ACCEPTABLE, SEE NOTE 4)



DETAIL WHEN SYSTEM IS INSTALLED WITH NEW JERSEY SHAPED BARRIER
(GROUND MOUNTED STEEL BREAKAWAY POST SHOWN SURFACE MOUNTED POSTS ACCEPTABLE, SEE NOTE 4)

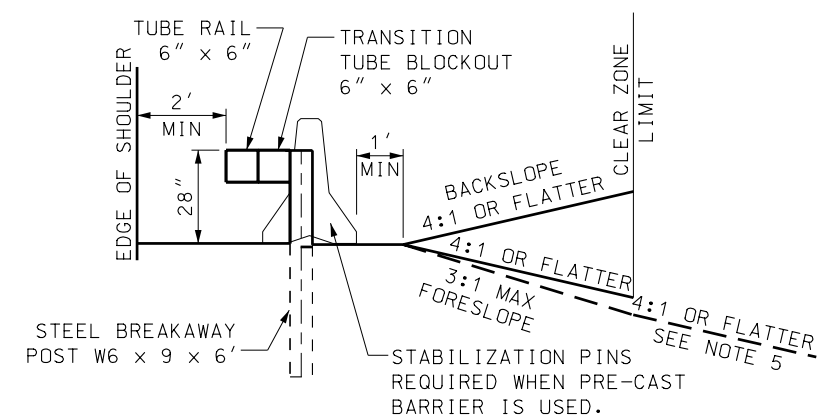
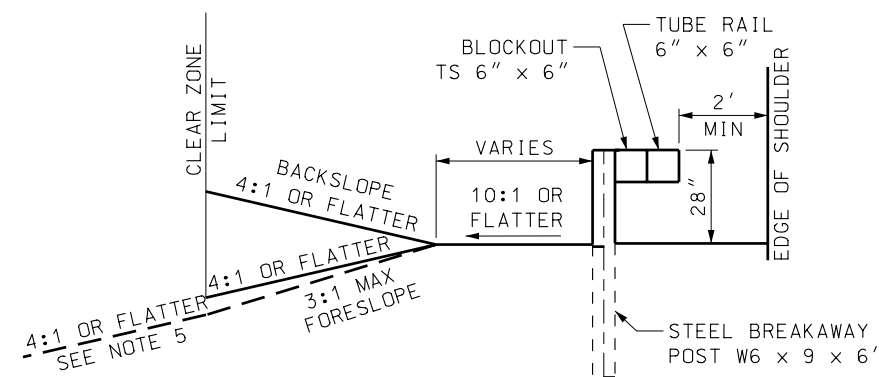
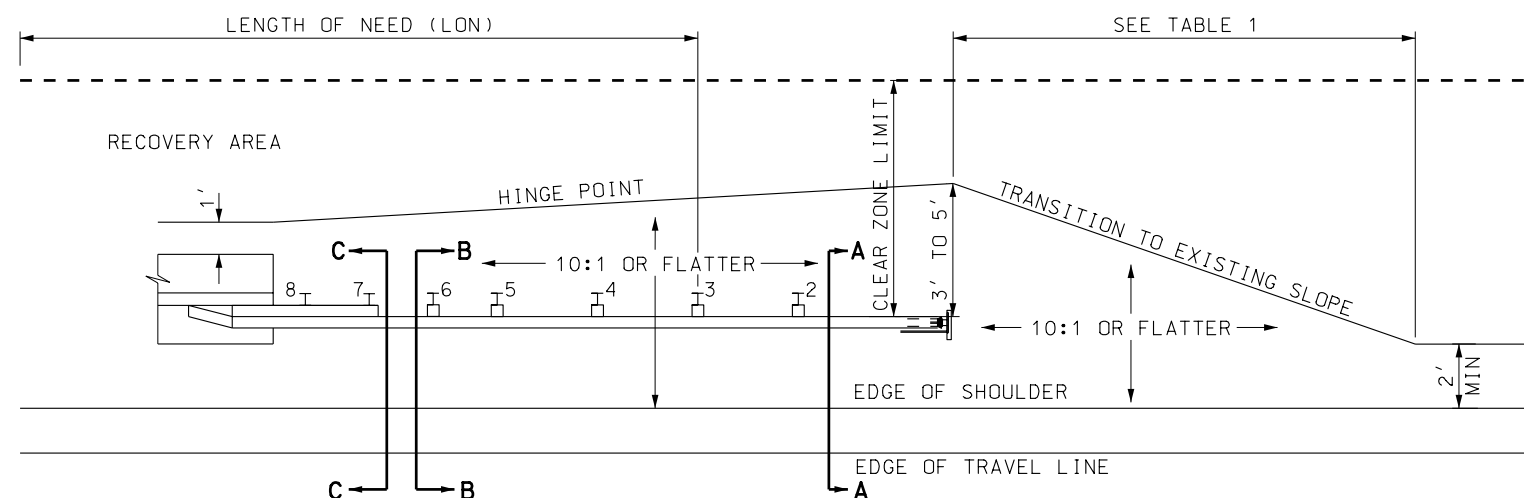


TABLE 1	
SPEED MPH	TAPER
LESS THAN 40	7:1
40 TO 55	10:1
60 TO 75	15:1

NOTES FOR CRASH CUSHION TYPE F

1. THE BEAT-SSCC, MANUFACTURED BY ROAD SYSTEMS INC. SEE UDOT'S GUIDELINES FOR CRASH CUSHIONS FOR SPECIFIC SYSTEM DETAILS.
2. USE SYSTEM WHEN DIRECT ATTACHMENT TO BARRIER IS REQUIRED AND THERE IS LESS THAN 125 FEET OF LONGITUDINAL SPACE IN FRONT OF THE HAZARD. INSTALL SYSTEM AS PER UDOT'S AND MANUFACTURER'S SPECIFICATIONS.
3. ATTACH SYSTEM TRANSITION TO BARRIER OR BRIDGE PARAPET AS PER MANUFACTURER'S REQUIREMENTS.
4. HAVE SHOP DRAWING AVAILABLE ON SITE FOR REFERENCE DURING INSTALLATION.
5. THE BEAT-SSCC REQUIRES A GRADED AND COMPACTED SURFACE WHEN GROUND MOUNTED POSTS ARE USED. SURFACE MOUNTED POST OPTIONAL. USE MANUFACTURER'S SPECIFICATIONS FOR CONCRETE PAD, POSTS AND MOUNTING HARDWARE.
6. COMPLETE SLOPE PREPARATION PRIOR TO INSTALLING SYSTEM.
 - A. USE 10:1 OR FLATTERSLOPES IN APPROACH AREA.
 - B. USE 4:1 OR FLATTER FORESLOPE OR BACKSLOPE IN THE RECOVERY AREA.
 - 1) IF A 4:1 FORESLOPE IN RECOVERY AREA IS IMPRACTICAL USE A RECOVERY AREA AT THE TOE OF THE 3:1 FORESLOPE OF 4:1 OR FLATTER.
 - 2) MAXIMUM 4:1 BACKSLOPE TO THE CLEAR ZONE LIMIT IN THE RECOVERY AREA.
7. CLEAR RECOVERY AND APPROACH AREAS OF ANY FIXED OBJECTS.
 - A. DO NOT PLACE SIGNS OR POLES IN APPROACH AREA.
 - B. USE BREAKAWAY SIGNS OR POLES WHEN PLACED IN RECOVERY AREA. MAINTAIN A MINIMUM 10 FOOT CLEARANCE TO SYSTEM.
8. INSTALL REQUIRED MARKING AS PER STD DWG CC 1, TYPE G.
9. REFER TO THE CURRENT EDITION OF THE AASHTO ROADSIDE DESIGN GUIDE TO DETERMINE LENGTH OF NEED (LON) AND CLEAR ZONE REQUIREMENTS.



06-SEP-2005 DGN File: L:\Standard_Drawings\Imperial\2005\Approved\Change4\Approved\CC07B.dgn

REVISIONS		
1	08/25/05	G.S. NEW DRAWING.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

RECOMMENDED FOR APPROVAL _____ DATE AUG. 25, 2005

CHAIRMAN STANDARDS COMMITTEE _____ DATE AUG. 25, 2005

APPROVED _____ DATE _____

DEPUTY DIRECTOR _____

CRASH CUSHION
TYPE F
BEAT-SSCC

STD DWG
CC 7B

STANDARD DRAWING TITLE

18-DEC-2006 DGN File: L:\Standard Drawings\Impervial\2005\Approved\Change8\Approved\CC8A.dgn

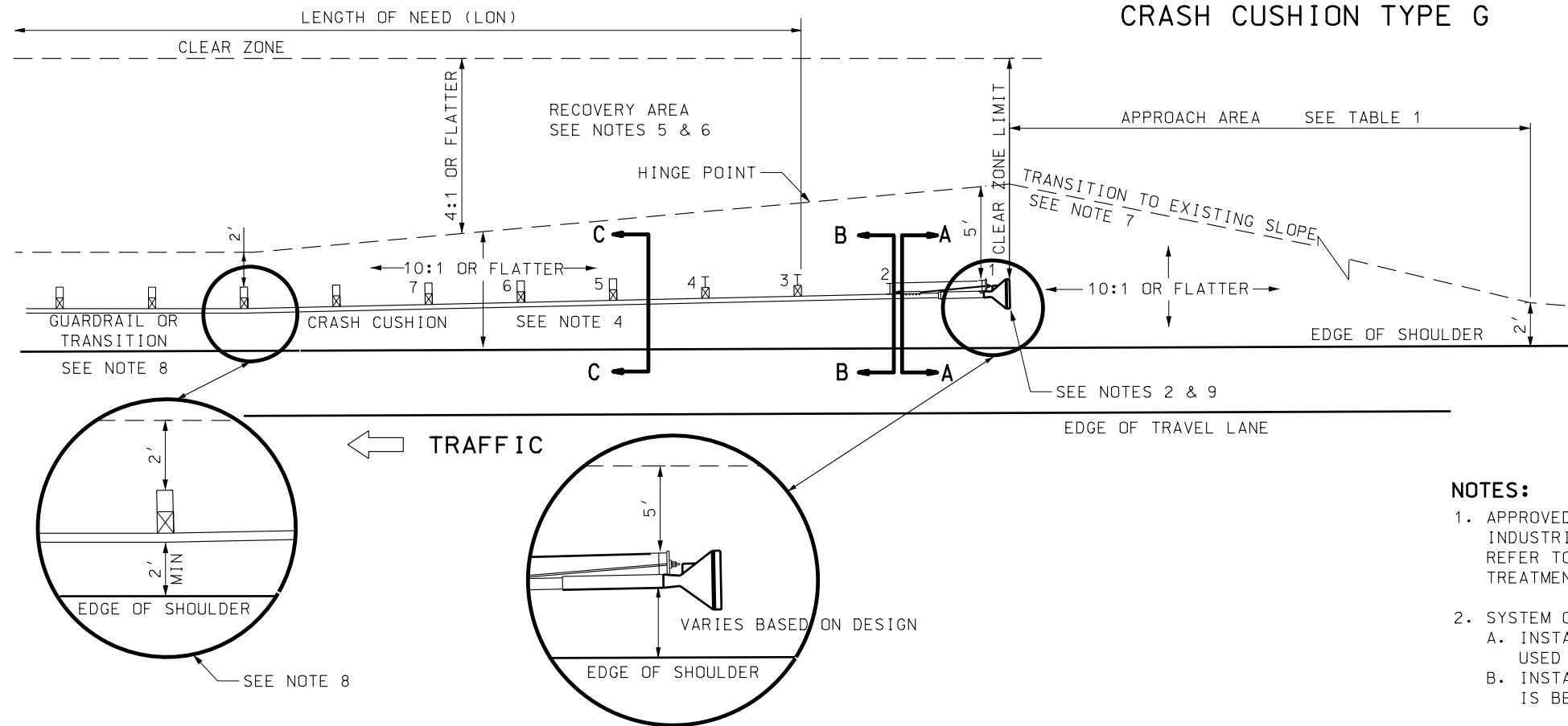
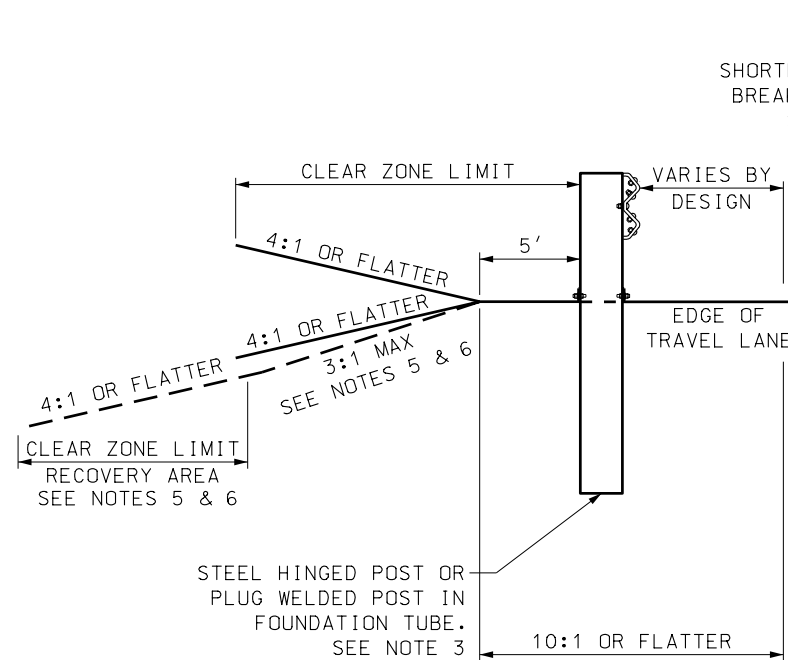


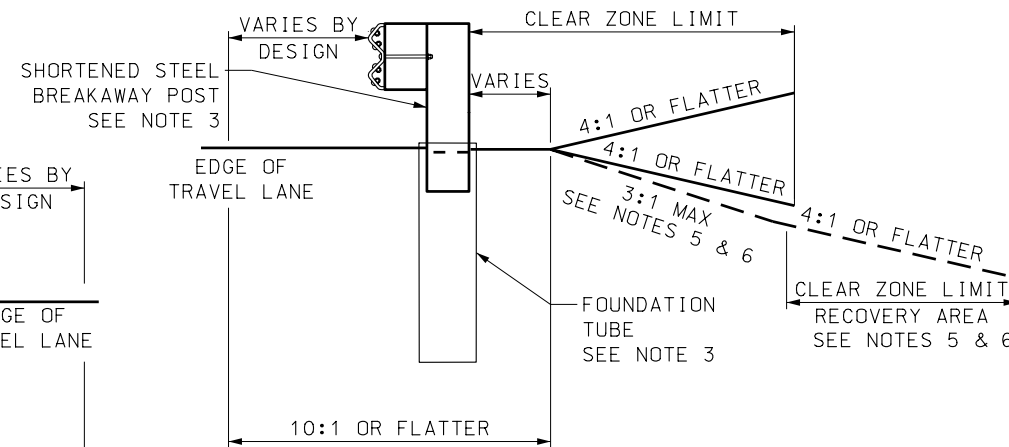
TABLE 1	
SPEED MPH	TAPER
LESS THAN 40	7:1
40 TO 55	10:1
60 TO 75	15:1

NOTES:

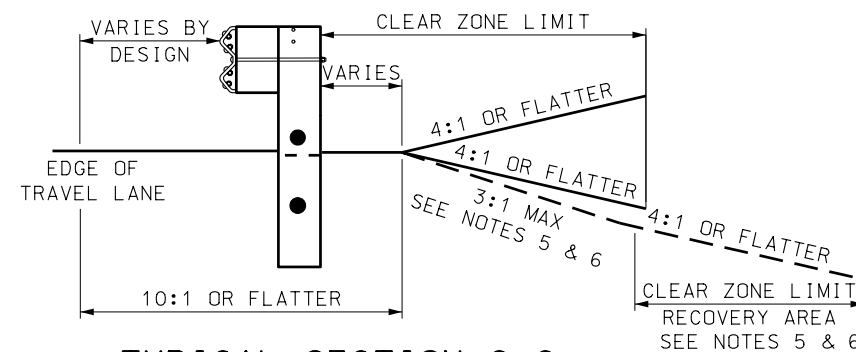
- APPROVED SYSTEMS: ET-2000 AND ET-PLUS MANUFACTURED BY TRINITY INDUSTRIES AND THE SKT-350, MANUFACTURED BY ROAD SYSTEMS INC. REFER TO UDOT'S GUIDELINES FOR CRASH CUSHIONS AND END TREATMENTS FOR SPECIFIC SYSTEM DETAILS.
- SYSTEM OFFSET:
 - INSTALL SYSTEM WITH 2 FOOT OFFSET (25:1 FLARE RATE) WHEN USED WITH A TANGENT BARRIER SYSTEM.
 - INSTALL SYSTEM AT THE SAME FLARE RATE AS THE BARRIER IT IS BEING ATTACHED TO.
- REFER TO UDOT'S GUIDELINES FOR CRASH CUSHION AND END TREATMENTS FOR POST REQUIREMENTS.
 - POST 1
 - ET SERIES-HINGE BREAKAWAY POST (HBA)
 - SKT-350 PLUG WELDED POST INSIDE FOUNDATION TUBE
- RAIL ELEMENTS
 - USE 12½ FOOT RAIL ELEMENTS AS SPECIFIED BY THE SYSTEM MANUFACTURER.
 - DO NOT BOLT RAIL ELEMENT AT POST 1.
 - REFER TO MANUFACTURE SPECIFICATIONS FOR OTHER RAIL TO POST BOLT REQUIREMENTS.
- COMPLETE SLOPE PREPARATION PRIOR TO INSTALLING SYSTEM.
 - USE 10:1 OR FLATTER SLOPES IN APPROACH AREA.
 - USE 4:1 OR FLATTER FORESLOPE OR BACKSLOPE IN THE RECOVERY AREA.
 - IF A 4:1 FORESLOPE IN RECOVERY AREA IS IMPRACTICAL USE A MAXIMUM 3:1 FORESLOPE. ESTABLISH A RECOVERY AREA AT THE TOE OF THE 3:1 FORESLOPE OF 4:1 OR FLATTER.
 - USE A 4:1 BACKSLOPE TO THE CLEAR ZONE LIMIT IN THE RECOVERY AREA. IF A 4:1 BACKSLOPE CANNOT BE ESTABLISHED A 3:1 BACKSLOPE IS PERMITTED.
- CLEAR RECOVERY AND APPROACH AREAS OF ANY FIXED OBJECTS.
 - DO NOT PLACE SIGNS OR POLES IN APPROACH AREA.
 - USE BREAKAWAY SIGNS OR POLES WHEN PLACED IN RECOVERY AREA, AND MAINTAIN A MINIMUM 10 FOOT CLEARANCE TO THE SIDES AND REAR OF THE SYSTEM.
- CONSTRUCT PLATFORM AS REQUIRED WHEN THE SPACE IS AVAILABLE EVEN IF THE PLATFORM EXTENDS BEYOND THE CLEAR ZONE REQUIREMENTS. SEE STD DWG CC8B FOR EXCEPTIONS.
- USE GUARDRAIL TRANSITION, STD DWG BA 4 SERIES, WHEN ATTACHING SYSTEM TO CONCRETE BARRIER OR BRIDGE PARAPET.
- INSTALL REQUIRED MARKINGS AS PER STD DWG CC 1.
- USE THE CURRENT EDITION, ROADSIDE DESIGN GUIDE TO ESTABLISH CLEAR ZONE REQUIREMENT AND LENGTH OF NEED (LON) REQUIREMENTS.



TYPICAL SECTION A-A
POST 1
SEE NOTE 3



TYPICAL SECTION B-B
POSTS 2-4



TYPICAL SECTION C-C
POSTS 5-8
SEE NOTE 3

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

GRADING AND
INSTALLATION DETAILS
CRASH CUSHION
TYPE G

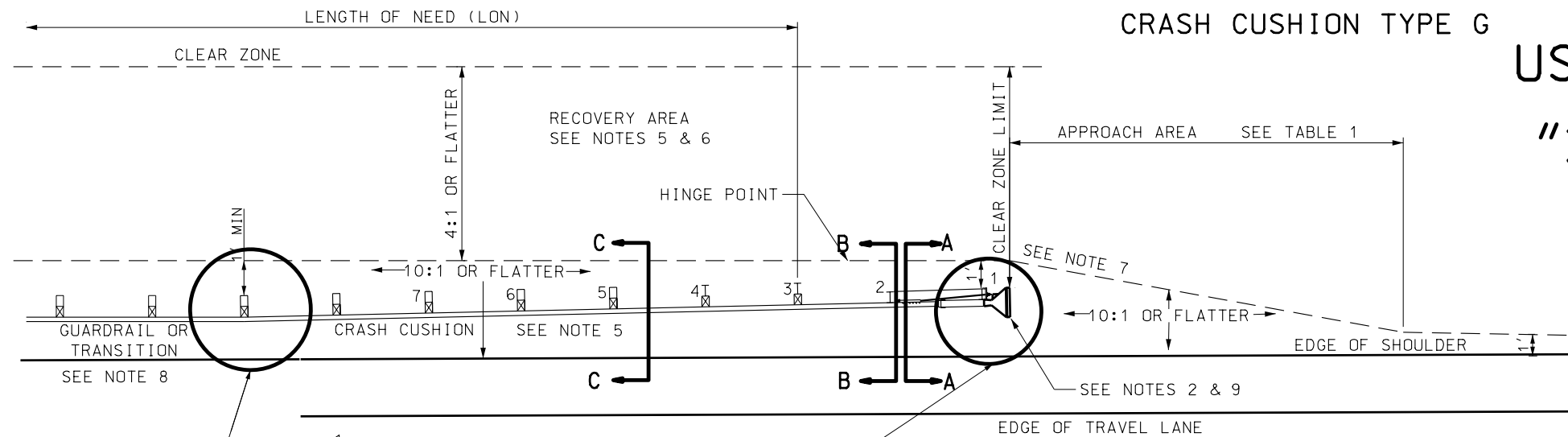
STD DWG
CC 8A

REVISIONS

NO.	DATE	APPR.	REMARKS
1	02/24/05	GS	MODIFIED RECOVERY AREA REQUIREMENTS, REVISED NOTES AND TABLE 1.
2	04/28/05	GS	REISSUED TO CORRECT OVERSIGHT.
3	11/30/06	GS	REVISED TO REFLECT STEEL POST REQUIREMENTS, NOTE 2 OFFSET REQUIREMENT.

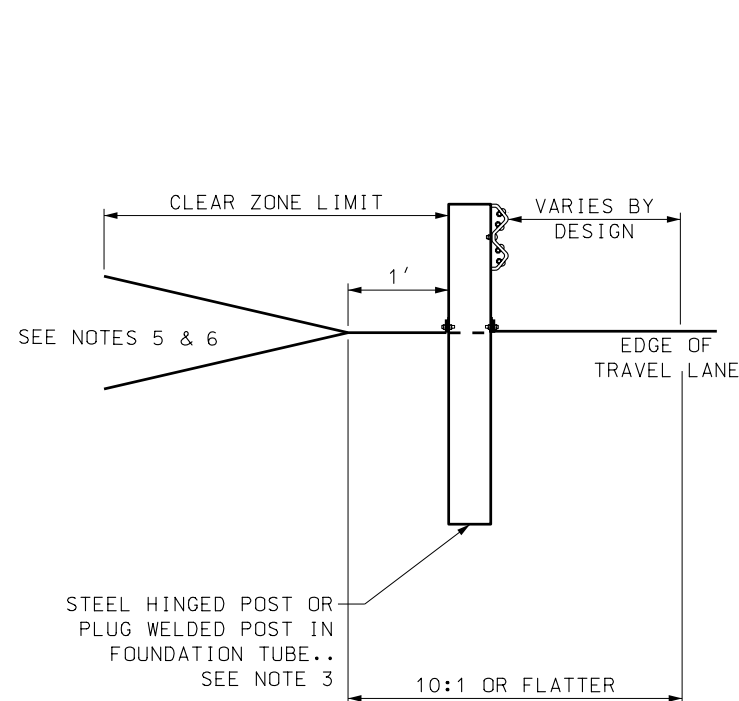
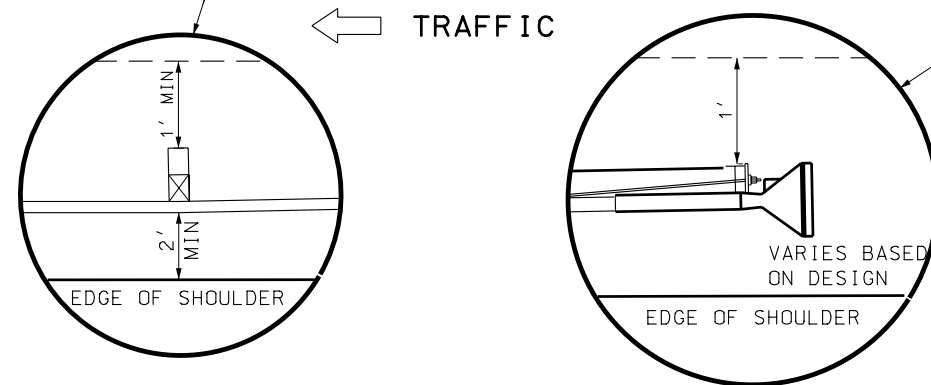
RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
NOV. 30, 2006
DATE
DEPUTY DIRECTOR
NOV. 30, 2006
DATE

18-DEC-2006 DGN File: L:\Standard Drawings\Impervial\2005\Approved\Change8\Approved\CC8B.dgn

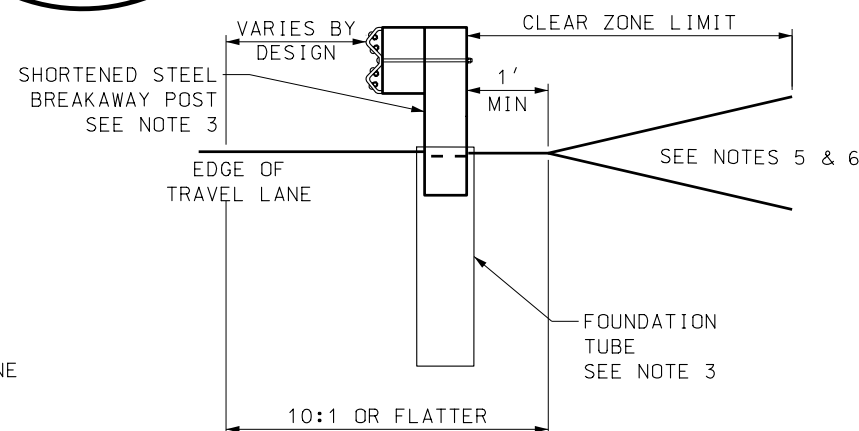


CRASH CUSHION TYPE G
USE THIS DETAIL FOR
"3R" PROJECTS ONLY

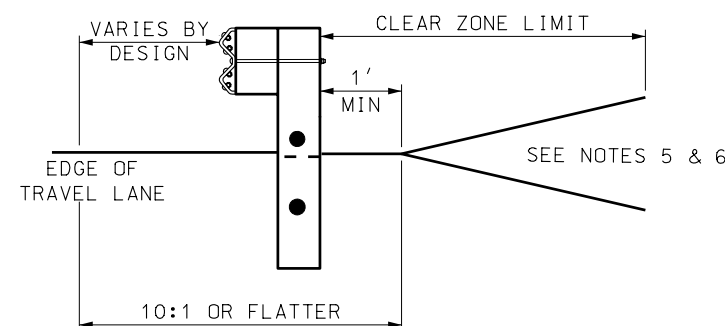
TABLE 1	
SPEED MPH	TAPER
LESS THAN 40	7:1
40 TO 55	10:1
60 TO 75	15:1



TYPICAL SECTION A-A
POST 1
SEE NOTE 3



TYPICAL SECTION B-B
POSTS 2-4



TYPICAL SECTION C-C
POSTS 5-8
SEE NOTE 3

NOTES:

- APPROVED SYSTEMS: ET-2000 AND ET-PLUS MANUFACTURED BY TRINITY INDUSTRIES AND THE SKT-350, MANUFACTURED BY ROAD SYSTEMS INC. REFER TO UDOT'S GUIDELINES FOR CRASH CUSHIONS AND END TREATMENTS FOR SPECIFIC SYSTEM DETAILS.
- SYSTEM OFFSET:
 - INSTALL SYSTEM WITH 2 FOOT OFFSET (25:1 FLARE RATE) WHEN USED WITH A TANGENT BARRIER SYSTEM.
 - INSTALL SYSTEM AT THE SAME FLARE RATE AS THE BARRIER INSTALLATION SYSTEM IS BEING ATTACHED TO.
- POST OPTIONS: REFER TO UDOT'S GUIDELINES FOR CRASH CUSHION FOR APPROVED POST OPTIONS.
 - POST 1
 - ET SERIES-HINGE BREAKAWAY POST (HBA)
 - SKT-350 PLUG WELDED POST INSIDE FOUNDATION TUBE.
- RAIL ELEMENTS
 - USE 12¹/₂ FOOT RAIL ELEMENTS AS SPECIFIED BY THE SYSTEM MANUFACTURER.
 - DO NOT BOLT RAIL ELEMENT TO POST 1.
 - REFER TO MANUFACTURE SPECIFICATIONS FOR OTHER RAIL TO POST BOLT REQUIREMENTS.
- COMPLETE SLOPE PREPARATIONS PRIOR TO INSTALLING SYSTEM.
 - USE 10:1 OR FLATTER SLOPES IN APPROACH AREAS.
 - CONSTRUCT RECOVER AREA SLOPE AS PER CC 8A WHEN CONDITIONS PERMIT. CONSULT ENGINEER FOR ALLOWABLE SLOPES WHEN SLOPE REQUIREMENTS OF CC 8A CANNOT BE MET.
- CLEAR RECOVERY AND APPROACH AREAS OF ANY FIXED OBJECTS.
 - DO NOT PLACE SIGNS OR POLES IN APPROACH AREA.
 - USE BREAKAWAY SIGNS OR POLES WHEN PLACED IN RECOVERY AREA, AND MAINTAIN A MINIMUM 10 FOOT CLEARANCE TO THE SIDES AND REAR OF THE SYSTEM.
- CONSTRUCT PLATFORM AS REQUIRED EVEN IF THE PLATFORM EXTENDS BEYOND THE CLEAR ZONE REQUIREMENT.
- USE GUARDRAIL TRANSITION, STD DWG BA 4 SERIES, WHEN ATTACHING SYSTEM TO CONCRETE BARRIER OR BRIDGE PARAPET.
- INSTALL REQUIRED MARKINGS AS PER STD DWG CC 1.
- USE THE CURRENT EDITION, ROADSIDE DESIGN GUIDE TO ESTABLISH CLEAR ZONE REQUIREMENT AND LENGTH OF NEED (LON) REQUIREMENTS.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

GRADING AND
INSTALLATION DETAILS
FOR "3R" PROJECTS
CRASH CUSHION TYPE G

STD DWG
CC 8B

REVISIONS
1 02/24/05 GS NEW DRAWING.

2 04/28/05 GS REISSUED TO CORRECT OVERSIGHT.

3 11/30/06 GS REVISED TO REFLECT STEEL POST REQUIREMENTS.
NOTE 2 OFFSET REQUIREMENT.

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
NOV. 30, 2006
DATE

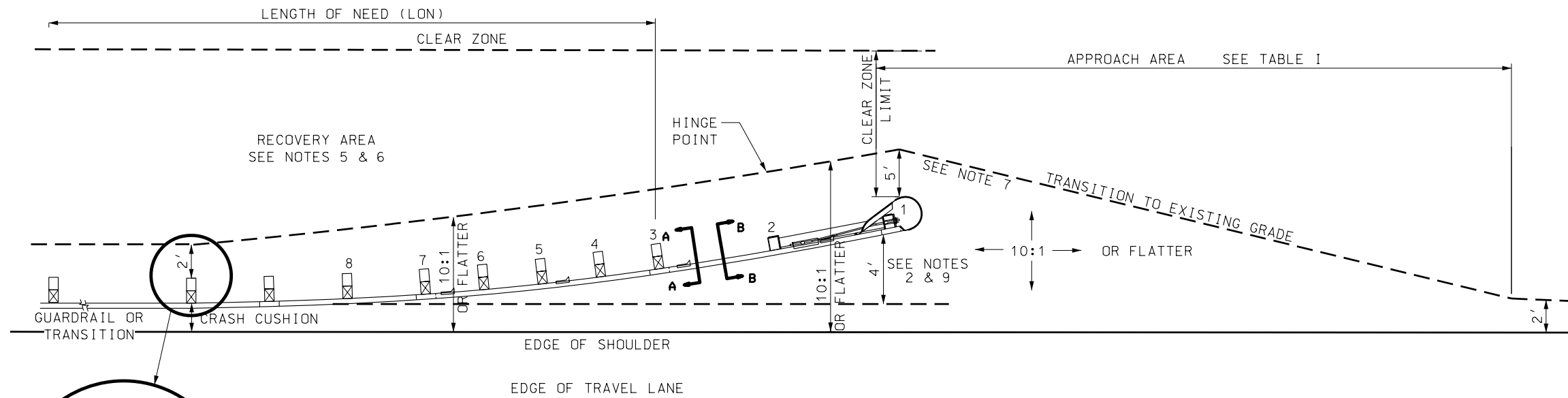
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NOV. 30, 2006
DATE

STANDARD DRAWING TITLE

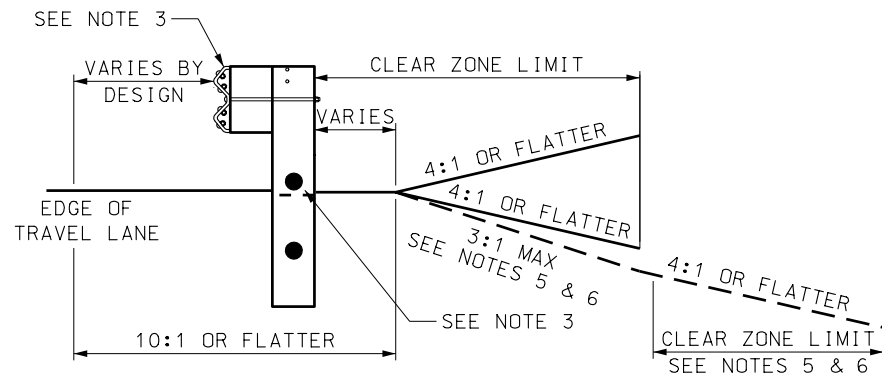
REMARKS

NO. DATE APPR.

10-MAY-2005 DGN File: L:\Standard Drawings\Impervial\2005\Approved\Change2\Approved\CC09B.dgn

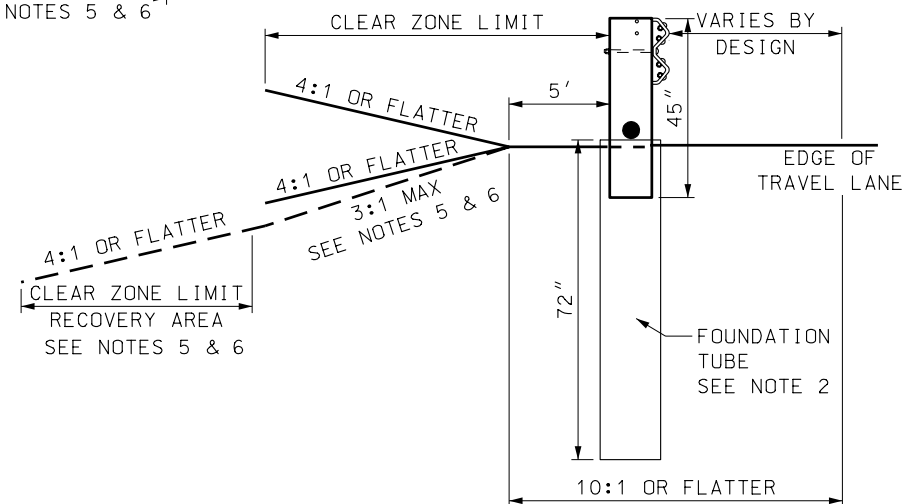


SRT-350
(8 POSTS)
SEE NOTE 1



TYPICAL SECTION A-A
POSTS 3-8

TABLE 1	
SPEED MPH	TAPER
LESS THAN 40	7:1
40 TO 55	10:1
60 TO 75	15:1

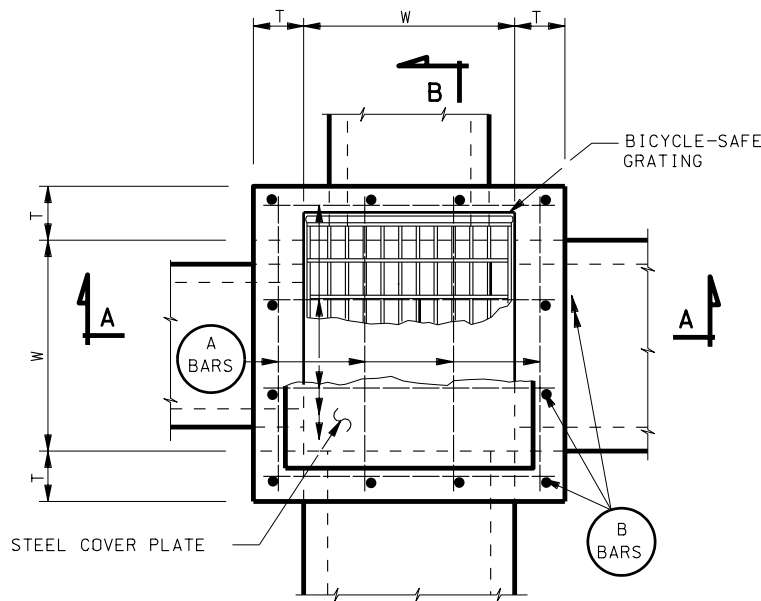


TYPICAL SECTION B-B
POSTS 1-2

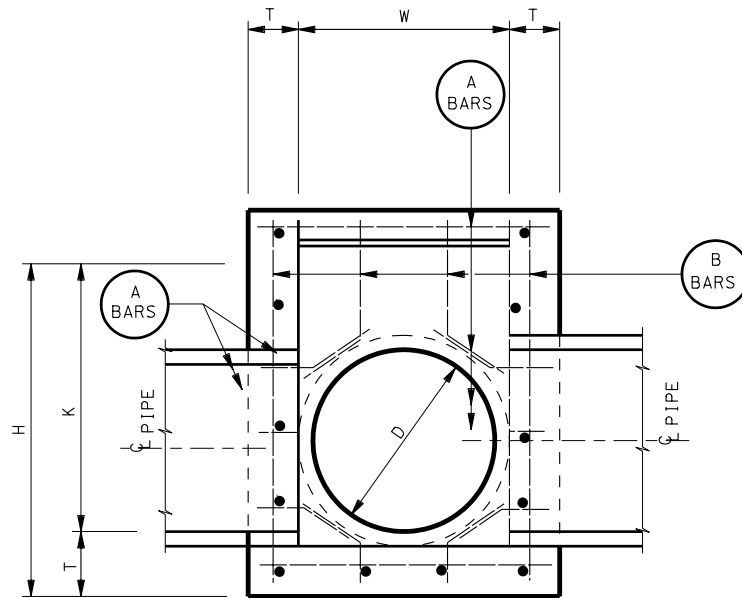
NOTES:

- APPROVED SYSTEM: SRT 350 MANUFACTURED BY TRINITY INDUSTRIES REFER TO UDOT'S GUIDELINES FOR CRASH CUSHIONS FOR SPECIFIC SYSTEM DETAILS.
- SYSTEM OFFSET:
 - THE SRT-350 INCORPORATES A PARABOLIC FLARE. INSTALL SYSTEM WITH A 4 FOOT OFFSET FROM THE BARRIER LINE EXTENDED ON BOTH A TANGENT AND FLARED INSTALLATION.
- POST OPTIONS:
 - WOOD POST ONLY
 - POSTS 1 AND 2, 45 INCH BREAKAWAY POSTS SET INSIDE 6 FOOT FOUNDATION TUBES. TUBES NO GREATER THAN 4 INCHES ABOVE GROUND.
 - POSTS 3 THROUGH 8 STANDARD CRT POST. THE BOTTOM OF THE TOP HOLE OF THE CRT POLE IS PLACED AT GROUND LEVEL.
- USE 12¹/₂ FOOT RAIL SECTIONS (3 EACH SECTIONS), SLOTTED AS PER MANUFACTURER'S REQUIREMENTS.
- COMPLETE SLOPE PREPARATION PRIOR TO INSTALLING SYSTEM.
 - USE 10:1 OR FLATTER SLOPES IN APPROACH AREA.
 - USE 4:1 OR FLATTER FORESLOPE OR BACKSLOPE IN THE RECOVERY AREA.
 - IF A 4:1 FORESLOPE. IN RECOVERY AREA IS IMPRACTICAL USE A MAXIMUM 3:1 FORESLOPE. ESTABLISH A RECOVERY AREA AT THE TOE OF THE 3:1 FORESLOPE OF 4:1 OR FLATTER.
 - USE A 4:1 BACKSLOPE TO THE CLEAR ZONE LIMIT IN THE RECOVERY AREA. IF A 4:1 CANNOT BE ESTABLISHED A 3:1 IS PERMITTED.
- CLEAR RECOVERY AND APPROACH AREAS OF ANY FIXED OBJECTS.
 - DO NOT PLACE SIGNS OR POLES IN APPROACH AREA.
 - USE BREAKAWAY SIGNS OR POLES WHEN PLACED IN RECOVERY AREA. MAINTAIN A MINIMUM 10 FOOT CLEARANCE TO THE SIDES AND REAR OF SYSTEM.
- CONSTRUCT PLATFORM AS REQUIRED EVEN IF THE PLATFORM EXTENDS BEYOND THE CLEAR ZONE REQUIREMENTS.
- USE GUARDRAIL TRANSITION, STD DWG BA 4 SERIES, WHEN ATTACHING THE SYSTEM TO CONCRETE BARRIER OR BRIDGE PARAPET.
- INSTALL REQUIRED MARKINGS AS PER STD DWG CC 1.
- USE THE CURRENT ROADSIDE DESIGN GUIDE TO ESTABLISH CLEAR ZONE REQUIREMENT AND LENGTH OF NEED (LON) REQUIREMENTS.

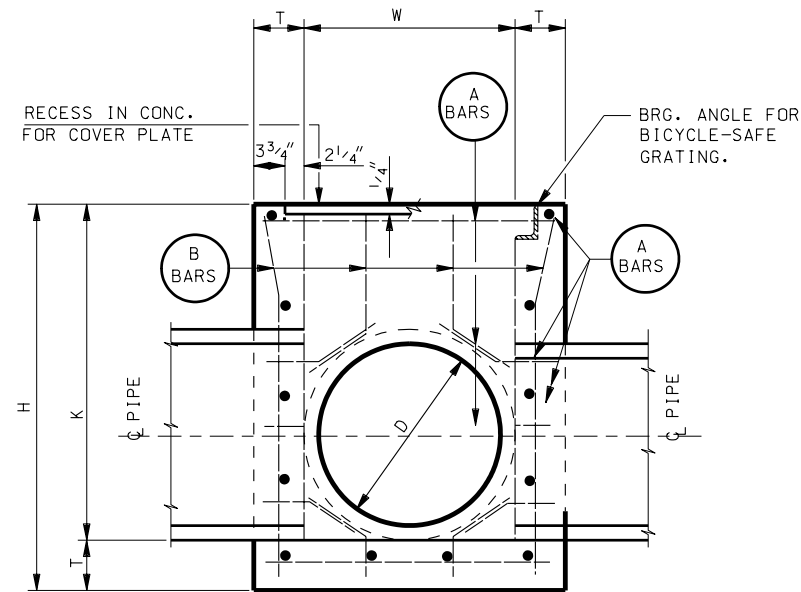
REVISIONS		UTAH DEPARTMENT OF TRANSPORTATION		GRADING AND INSTALLATION DETAILS	
1	02/24/05	CS	MODIFIED RECOVERY AREA REQUIREMENTS, REVISED NOTES AND TABLE 1.	STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION	
2	04/28/05	CS	REISSUED TO CORRECT OVERSIGHT.	CRASH CUSHION TYPE H (PARABOLIC FLARE)	
		RECOMMENDED FOR APPROVAL		STANDARD DRAWING TITLE	
		CHAIRMAN STANDARDS COMMITTEE		STD DWG	
		APPROVED		CC 9B	
		DEPUTY DIRECTOR			
		DATE			
		APR.28.2005			
		APR.28.2005			
		REMARKS			



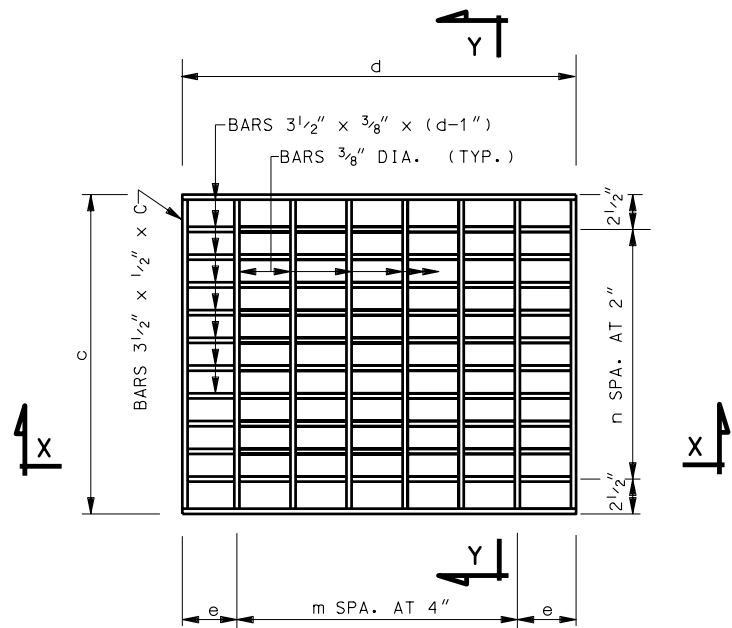
PLAN



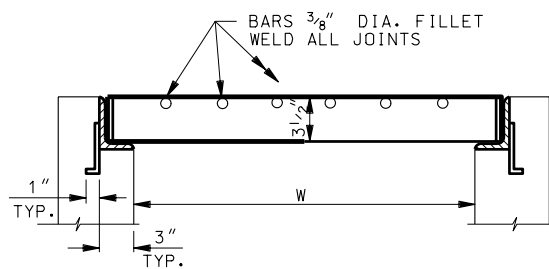
SECTION A-A



SECTION B-B

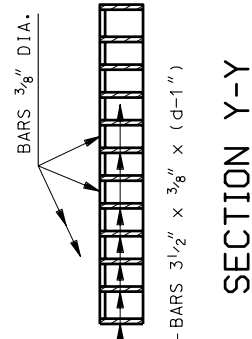


PLAN (GRATING)

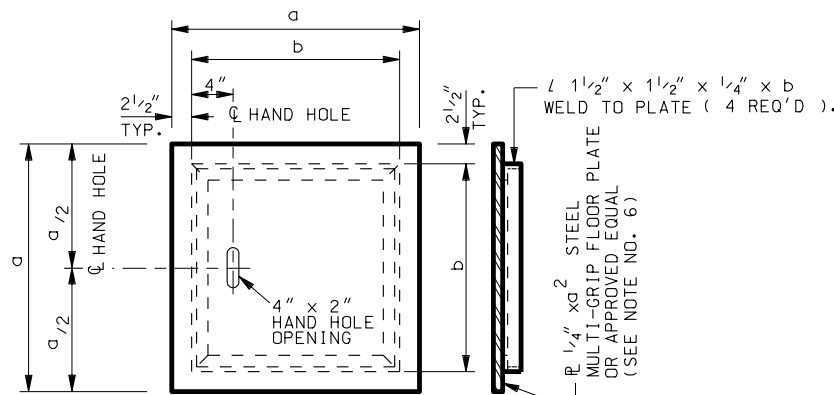
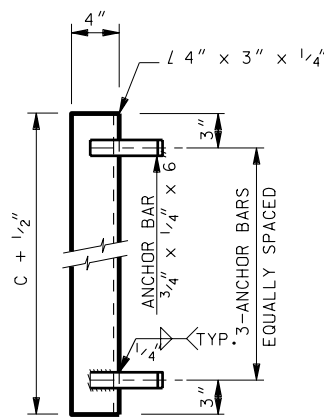


SECTION X-X

BICYCLE-SAFE GRATING



SECTION Y-Y



STEEL COVER PLATE DETAILS

GENERAL NOTES FOR DB 1A TO DB 3C

1. USE COATED DEFORMED BILLET STEEL BARS CONFORMING TO AASHTO M 284 OR M 111 AND M 31 GRADE 60, RESPECTIVELY.
2. USE STRUCTURAL STEEL CONFORMING TO AASHTO M 270 GRADE 36 EXCEPT WHERE NOTED OTHERWISE.
3. HOT-DIP GALVANIZE THE GRATING AND FRAME AFTER FABRICATION IN ACCORDANCE WITH AASHTO M 111.
4. TYPE II CEMENT (LOW ALKALI), STRUCTURAL CONCRETE REQUIRED.
5. PIPES AND BOX TO BE ARRANGED TO SUIT CONDITIONS. CUT AND BEND BARS WHERE NECESSARY TO CLEAR PIPE. ALL BARS TO BE #5 AT 12" PLUS OR MINUS.
6. COVER PLATE ALTERNATE FOR GRATING. COVER PLATE IS NOT DESIGNED FOR WHEEL LOAD. (SEE STD DWG CB 4 FOR SOLID COVER FOR HS 20-44 LOADING).
7. DEDUCT CONCRETE DISPLACED BY PIPE(S) FROM THOSE CONCRETE QUANTITIES GIVEN IN SCHEDULE NO. 1.

DESIGN DATA

HS 20-44 OR INTERSTATE ALTERNATE LOADING IN ACCORDANCE WITH CURRENT AASHTO AND INTERIM SPECIFICATIONS.

LIVE LOAD: HS 20-44
 $f_c = 1,400$ psi
 $f_s = 24,000$ psi (REINFORCING STEEL)
 $f_s = 20,000$ psi (STRUCTURAL STEEL)
 $n = 8$

DIMENSIONS & QUANTITIES

(SEE SCHEDULES ON STD DWG DB 1D)

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

RECOMMENDED FOR APPROVAL: *[Signature]* JAN. 01, 2005 DATE

CHAIRMAN STANDARDS COMMITTEE

APPROVED: *[Signature]* JAN. 01, 2005 DATE

DEPUTY DIRECTOR

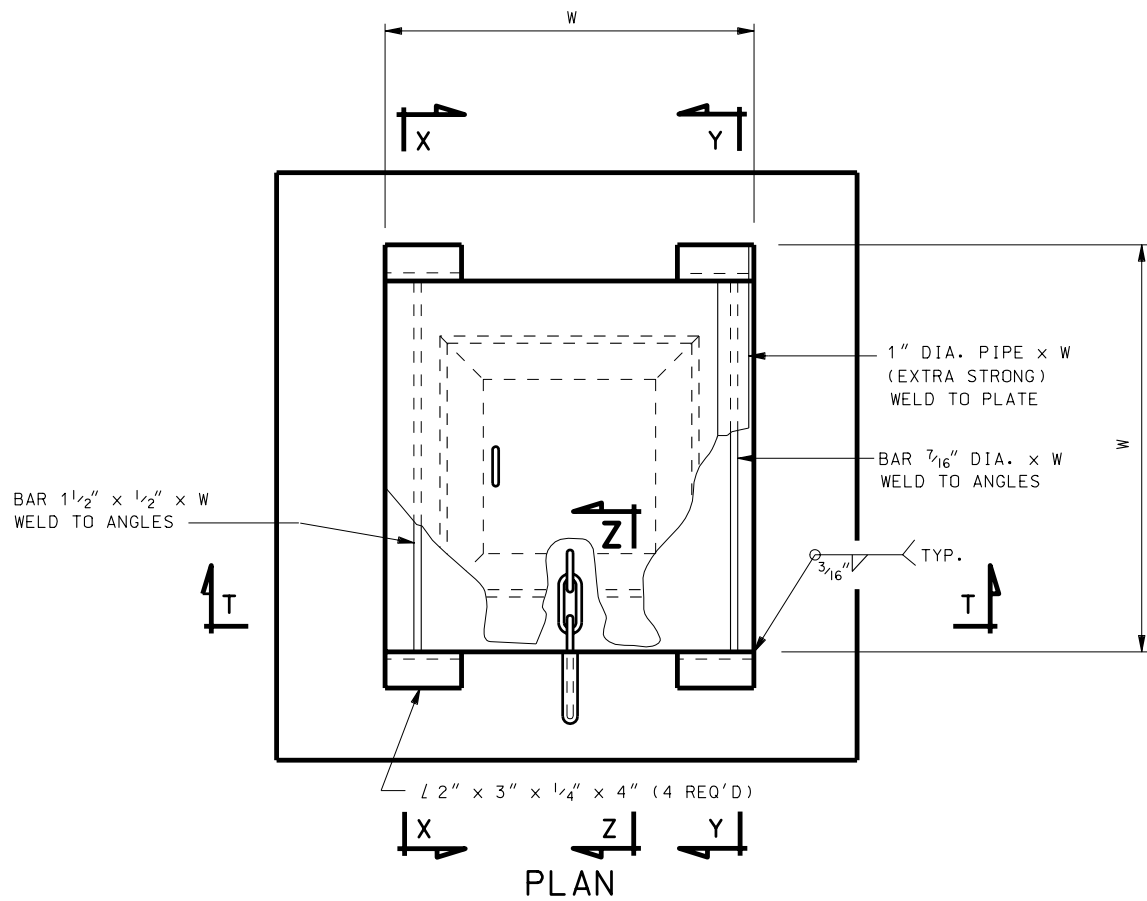
STANDARD DIVERSION
BOX/COVER PLATE/
GRATING FOR
18" DIA. OR 24" DIA. PIPE

STANDARD DRAWING TITLE

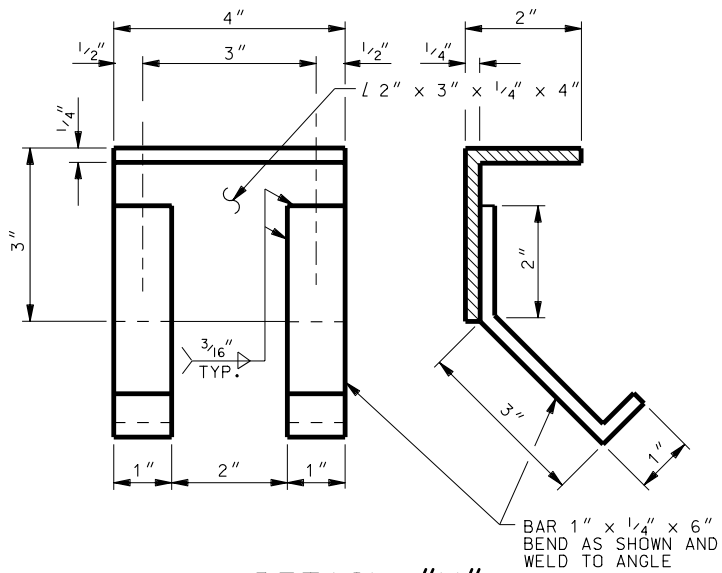
STD DWG
DB 1A

REVISIONS

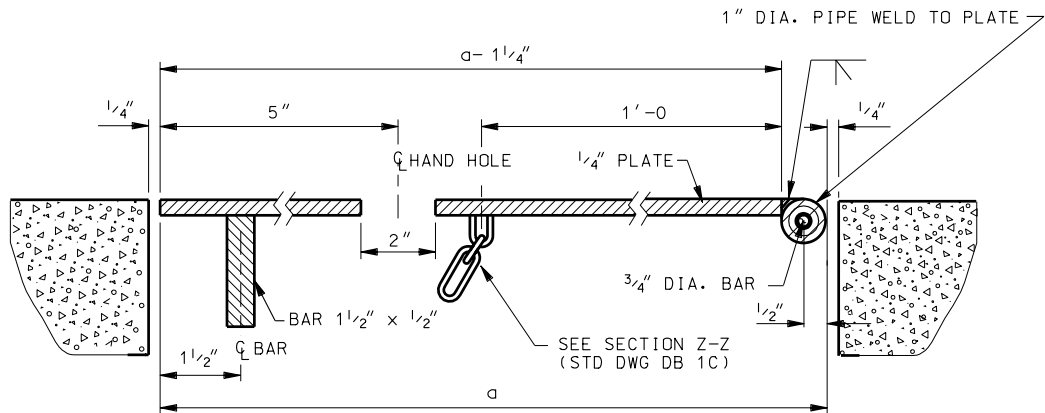
REMARKS



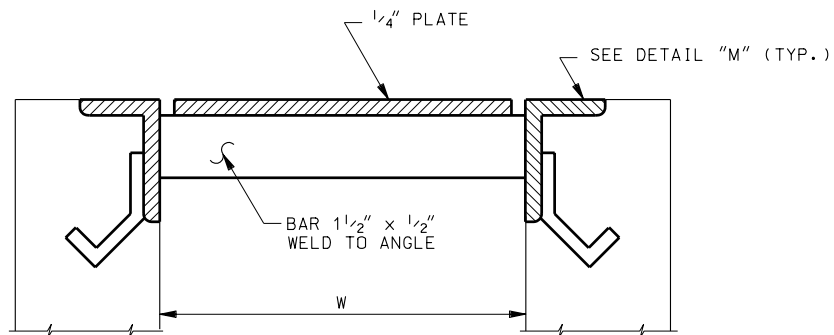
DETAILS OF SHEET COVER PLATE
(SECTION Z-Z IS ON STD DWG DB 1C)



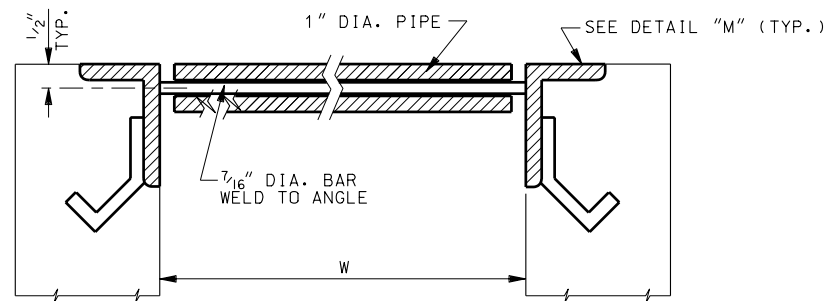
DETAIL "M"
HINGED LID DETAILS



SECTION T-T



SECTION X-X



SECTION Y-Y

DIMENSION & QUANTITIES
(SEE SCHEDULE ON STD DWG DB 1D)

REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

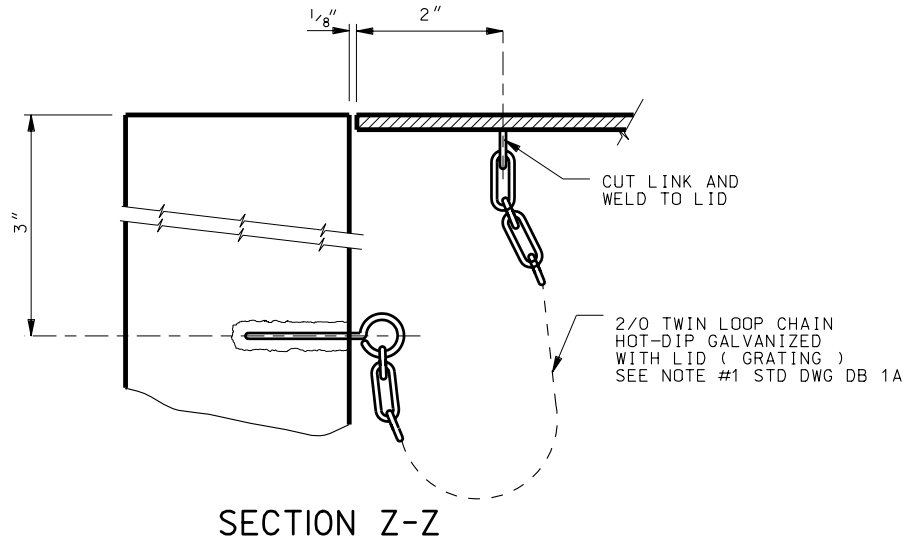
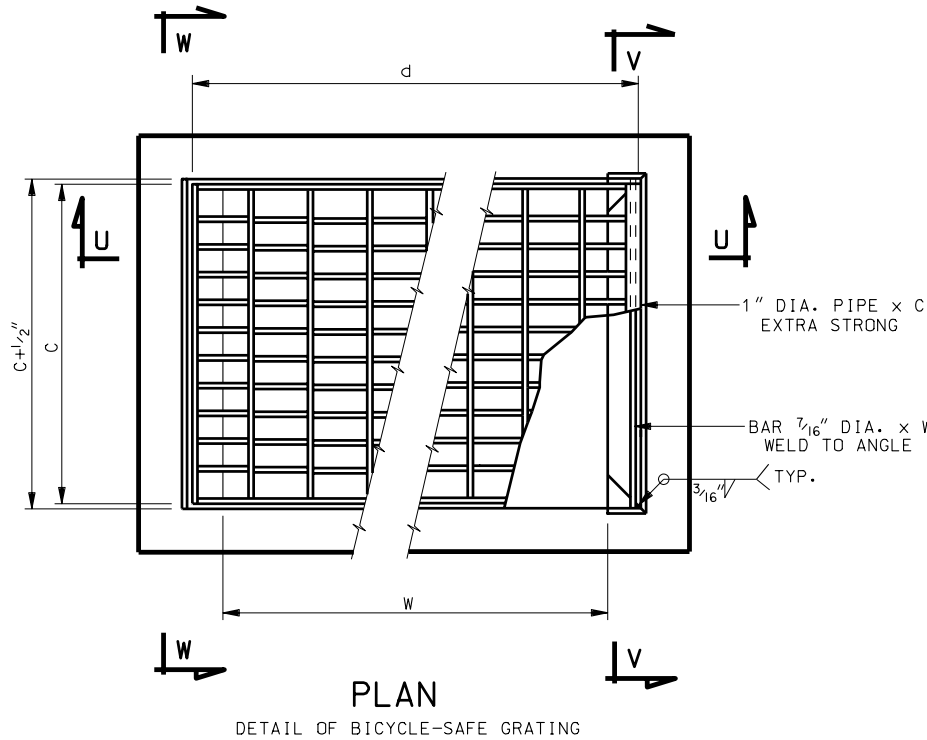
STANDARD DIVERSION
BOX HINGED LID
DETAILS FOR
18" DIA. OR 24" DIA. PIPE

STD DWG
DB 1B

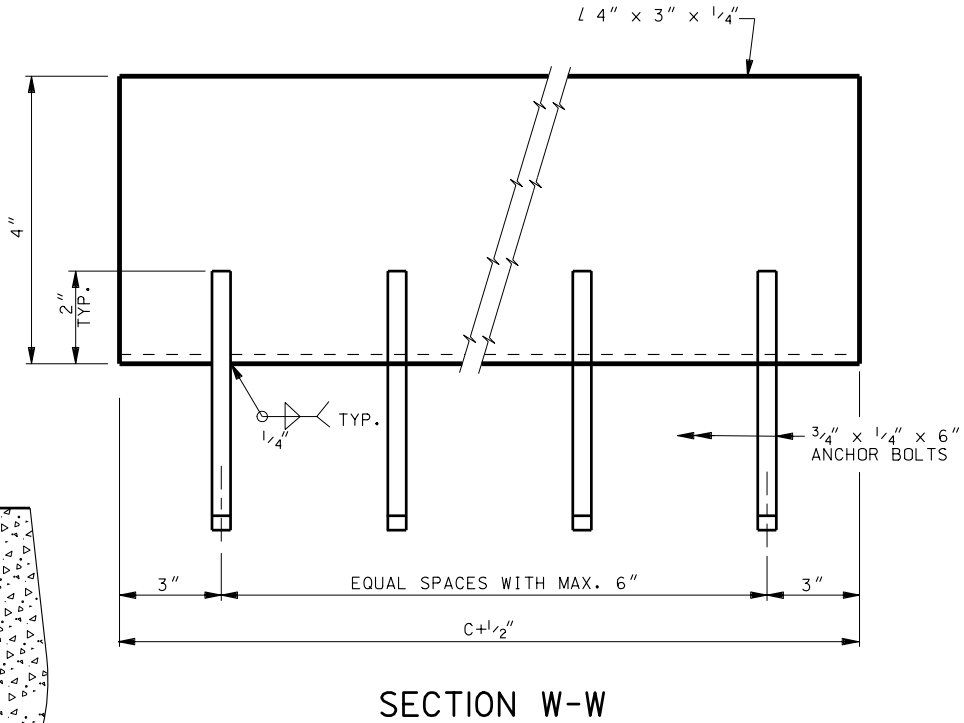
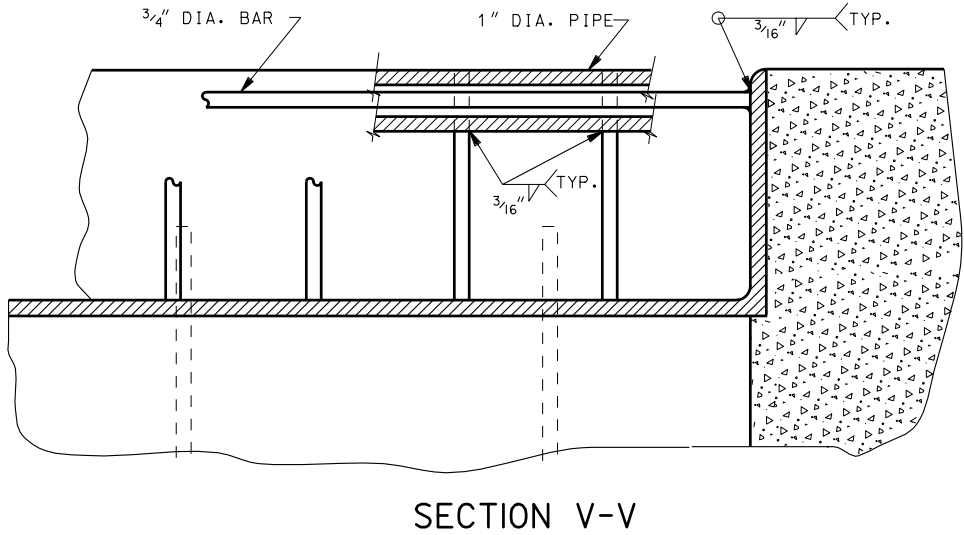
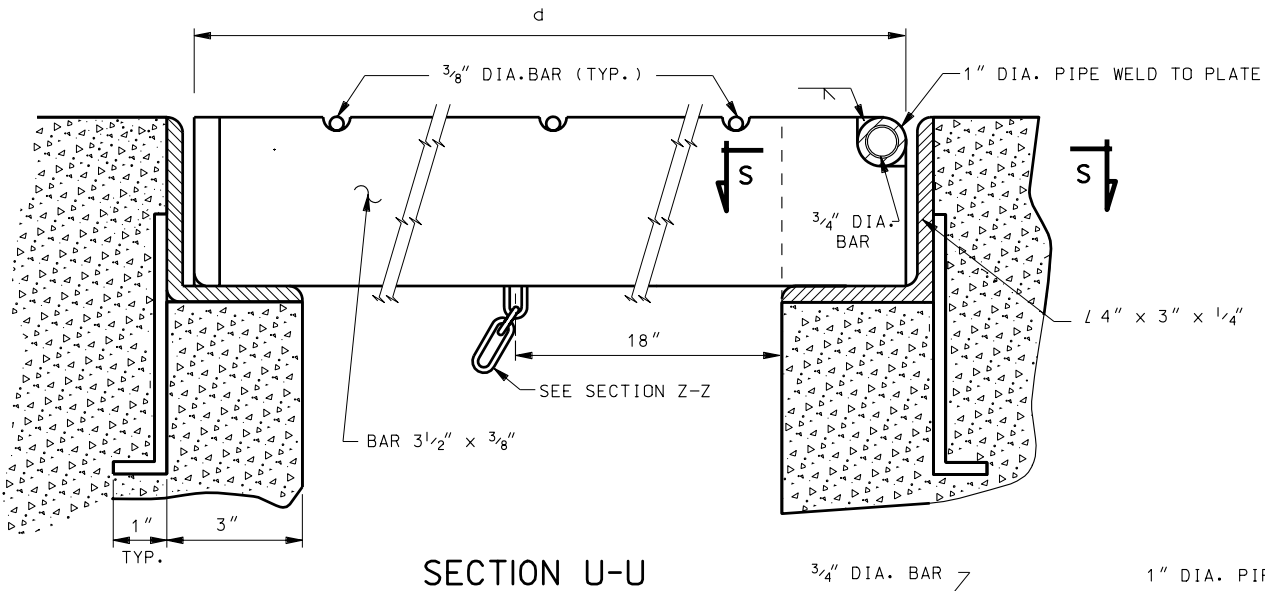
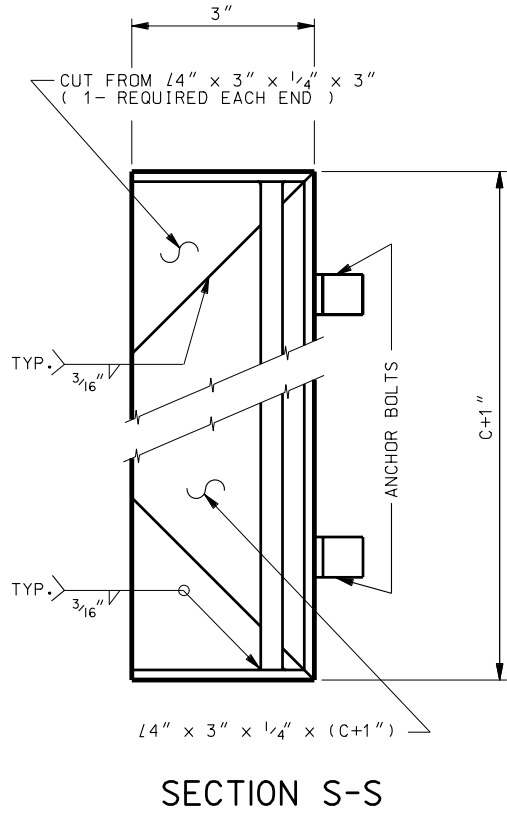
RECOMMENDED FOR APPROVAL
SALT LAKE COUNTY
CHAIRMAN STANDARDS COMMITTEE
APPROVED
JAN.01.2005
DATE
JAN.01.2005
DATE
DEPUTY DIRECTOR

REMARKS

NO. DATE APPR.



NOTE #1 STD DWG DB 1A
LENGTH OF CHAIN:
FOR LID: L = 1'-9
FOR GRATING: L = 2'-6



DIMENSIONS & QUANTITIES
(SEE SCHEDULES ON STD DWG DB 1D)

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

STANDARD DIVERSION
BOX BICYCLE-SAFE
GRATING DETAILS FOR
18" DIA OR 24" DIA PIPE

STD DWG
DB 1C

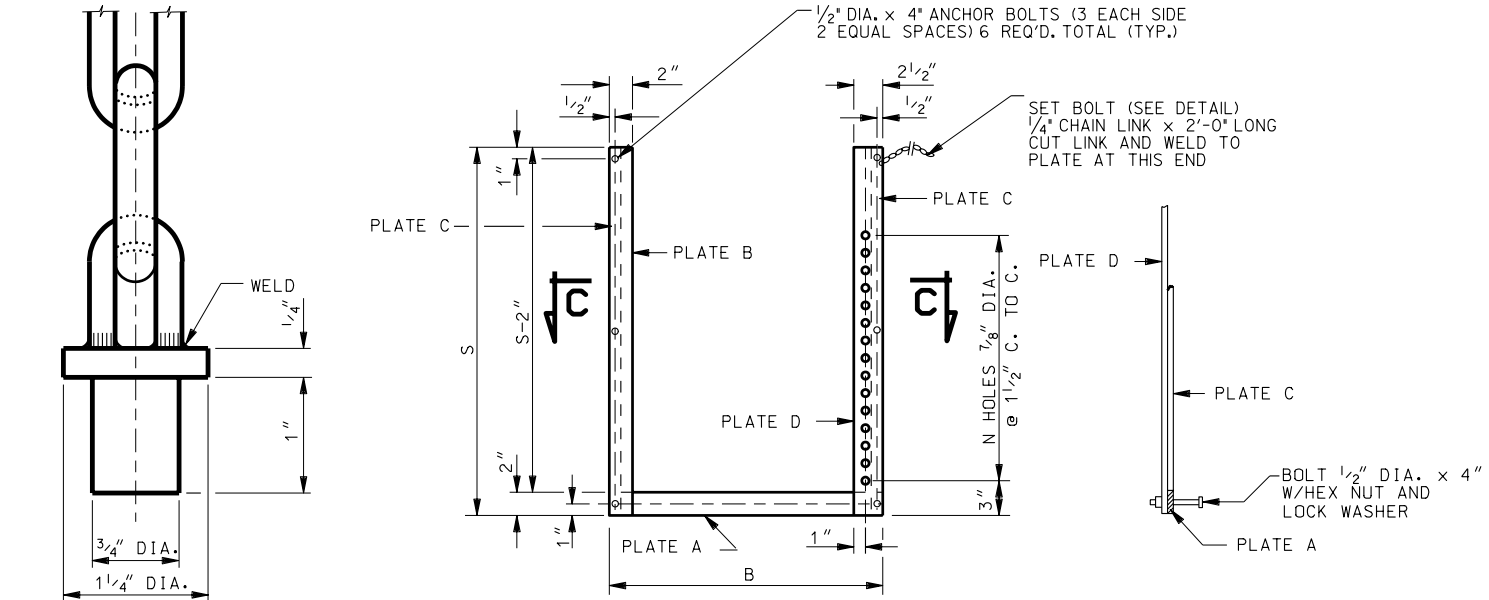
STANDARD DRAWING TITLE

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR
DATE
JAN 01 2005
DATE
JAN 01 2005

REVISIONS

REMARKS

NO. DATE APPR.



SET BOLT DETAIL

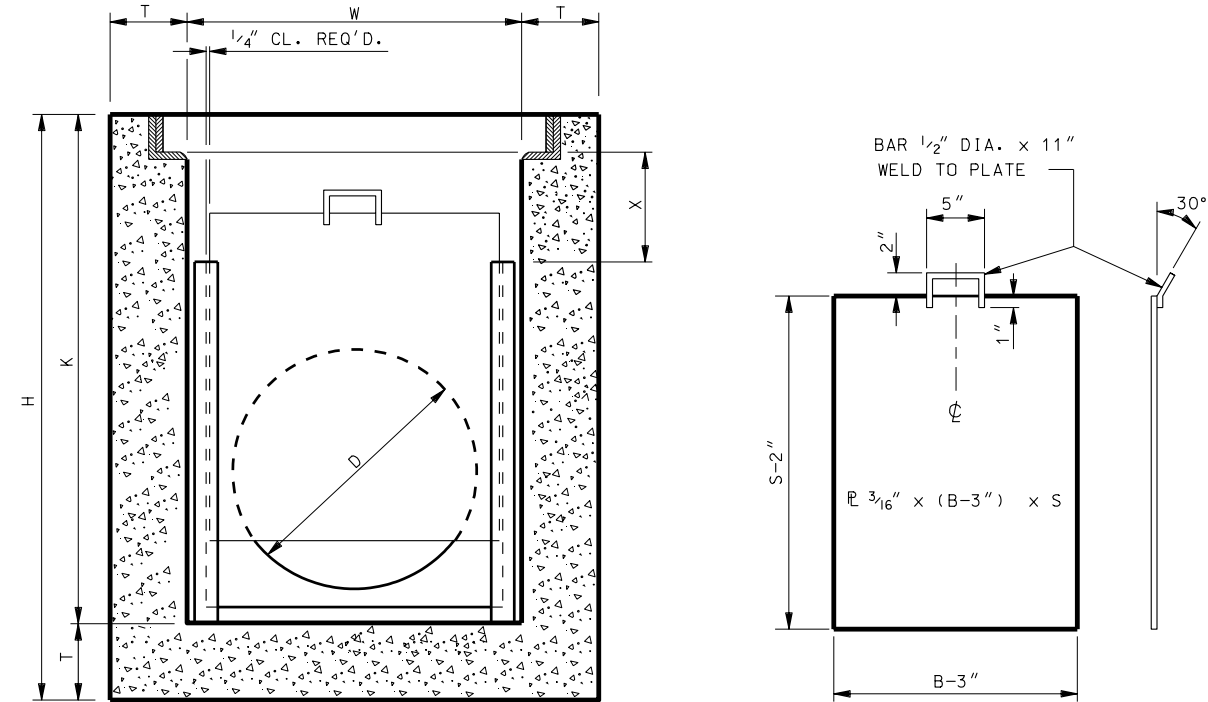
FRAME DETAILS

SCHEDULE NO. 1																
LINE	DIMENSIONS					REINFORCING STEEL				QUANTITIES						
	H	K	W	T	X	A-BARS		B-BARS		REINF. STEEL LB.	CONC. CU. YD.	STRUCTURAL STEEL				
						LENGTH	NO.	LENGTH	NO.			GRATING LBS.	COVER PLATE LBS.	FRAME LBS.	GATE LBS.	
1	2'-6"	2'-0"	2'-0"	6"	0	2'-8"	12	2'-1"	12	59	.525	177	80	18	26	
2	3'-0"	2'-6"	▲	▲	6"	▲	16	2'-7"	▲	77	.617	▲	▲	▲	▲	
3	3'-6"	3'-0"	▲	▲	1'-0"	▲	16	3'-1"	▲	83	.710	▲	▲	▲	▲	
4	4'-0"	3'-6"	▲	▲	1'-6"	▲	20	3'-7"	▲	100	.802	▲	▲	▲	▲	
5	4'-6"	4'-0"	▲	▲	2'-0"	▲	20	4'-1"	▲	107	.895	▲	▲	▲	▲	
6	5'-0"	4'-6"	▲	▲	2'-6"	▲	24	4'-7"	▲	124	.988	▲	▲	▲	▲	
7	5'-6"	5'-0"	▲	▲	3'-0"	▲	24	5'-1"	▲	130	1.080	▲	▲	▲	▲	
8	6'-0"	5'-6"	▲	▲	3'-6"	▲	28	5'-7"	▲	148	1.173	▲	▲	▲	▲	
9	6'-6"	6'-0"	▲	▲	4'-0"	▲	28	6'-1"	▲	154	1.265	▲	▲	▲	▲	
10	7'-0"	6'-6"	2'-0"	6"	4'-6"	2'-8"	32	6'-7"	12	171	1.358	177	80	18	26	
11	3'-0"	2'-6"	2'-6"	6"	0	3'-2"	16	2'-7"	12	85	.770	254	114	21	41	
12	3'-6"	3'-0"	▲	▲	6"	▲	16	3'-1"	▲	91	.878	▲	▲	▲	▲	
13	4'-0"	3'-6"	▲	▲	1'-0"	▲	20	3'-7"	▲	111	.989	▲	▲	▲	▲	
14	4'-6"	4'-0"	▲	▲	1'-6"	▲	20	4'-1"	▲	117	1.100	▲	▲	▲	▲	
15	5'-0"	4'-6"	▲	▲	2'-0"	▲	24	4'-7"	▲	137	1.211	▲	▲	▲	▲	
16	5'-6"	5'-0"	▲	▲	2'-6"	▲	24	5'-1"	▲	143	1.323	▲	▲	▲	▲	
17	6'-0"	5'-6"	▲	▲	3'-0"	▲	28	5'-7"	▲	162	1.434	▲	▲	▲	▲	
18	6'-6"	6'-0"	▲	▲	3'-6"	▲	28	6'-1"	▲	169	1.545	▲	▲	▲	▲	
19	7'-0"	6'-6"	▲	▲	4'-0"	▲	32	6'-7"	▲	188	1.656	▲	▲	▲	▲	
20	7'-6"	7'-0"	2'-6"	6"	4'-6"	3'-2"	32	7'-1"	12	194	1.767	254	114	21	41	

SCHEDULE NO. 2																
PIPE SIZE	DIMENSIONS AND QUANTITIES															
	COVER PLATE		BICYCLE-SAFE GRATING					FRAME AND GATE								
	D	a	b	c	d	e	m	n	B	S	N	1-PL. A	1-PL. B	2-PL. C	1-PL. D	GATE
18"	2'-4"	1'-11"	1'-11"	2'-4 1/2"	4 1/4"	5	9	1'-11"	2'-0"	12	1/4"x2"x1'-11"	1/4"x2"x2'-0"	1/4"x1"x1'-10"	1/4"x2 1/2"x2'-0"	3/16"x20 1/2"x1'-10"	
24"	2'-10"	2'-5"	2'-5"	2'-10 1/2"	5 1/4"	6	12	2'-5"	2'-6"	15	1/4"x2"x2'-5"	1/4"x2"x2'-6"	1/4"x1"x2'-4"	1/4"x2 1/2"x2'-6"	3/16"x26 1/2"x2'-4"	
D	a															
18"	1'-11 1/2"															
24"	2'-5 1/2"															

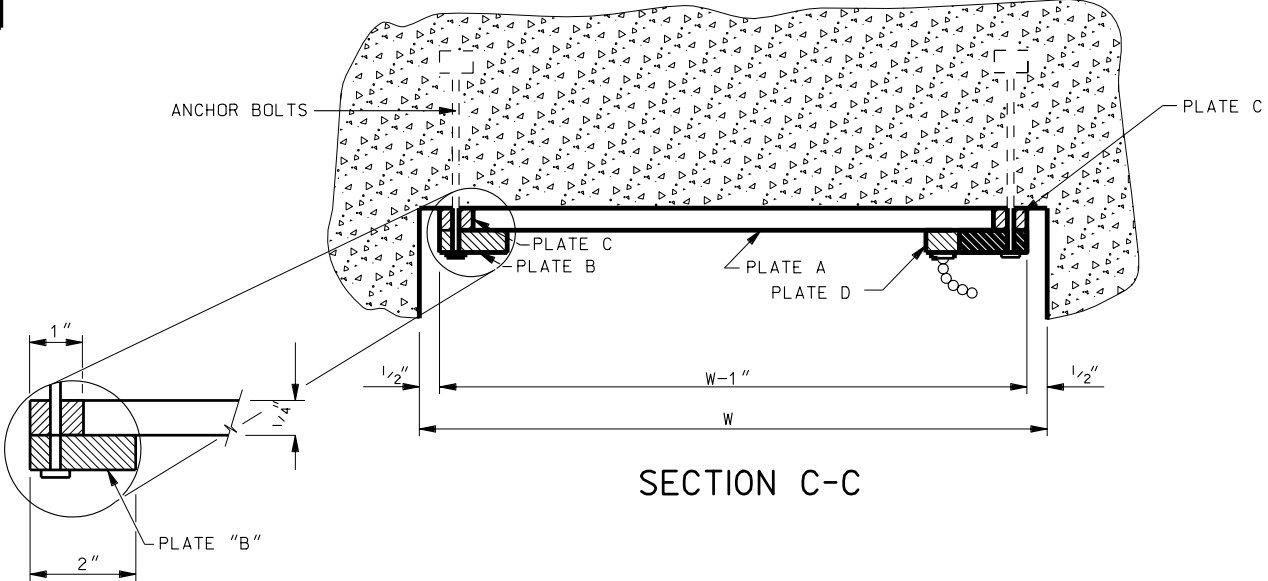
SEE NOTE 4

SEE NOTE 5



FRAME AND GATE INSTALLATION DETAIL

GATE



SECTION C-C

- NOTES:
- CALCULATIONS OF CONCRETE QUANTITIES ARE FOR BOXES WITH BICYCLE-SAFE GRATING AND NO OPENINGS FOR PIPE(S).
 - FOR SOLID COVER ADD .011 CU. YD. OF CONCRETE IN LINES 1 THRU 10 INCLUSIVE AND .014 CU. YD. OF CONCRETE IN LINES 11 THRU 20 INCLUSIVE AND DEDUCT .053 CU. YD. OF CONCRETE FOR EACH 18" DIA. PIPE IN LINES 1 THRU 10 INCLUSIVE AND .091 CU. YD. OF CONCRETE FOR EACH 24" DIA. PIPE IN LINES 11 THRU 20 INCLUSIVE.
 - IF DIMENSION X IS LESS THAN INSIDE PIPE DIAMETER D, THE GATE(S) CAN ONLY BE PARTIALLY OPENED TO ALLOW THE GRATING OR COVER PLATE TO BE REPLACED.
 - SEE STD DWG CB 4 FOR SOLID COVER PLATE DETAILS.
 - SEE STD DWG DB 1B FOR HINGED LID DETAILS.

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

RECOMMENDED FOR APPROVAL

CHAIRMAN STANDARDS COMMITTEE

APPROVED

DEPUTY DIRECTOR

STANDARD DIVERSION BOX THREE GATE BOX SECTIONS FOR 18" DIA. OR 24" DIA. PIPE

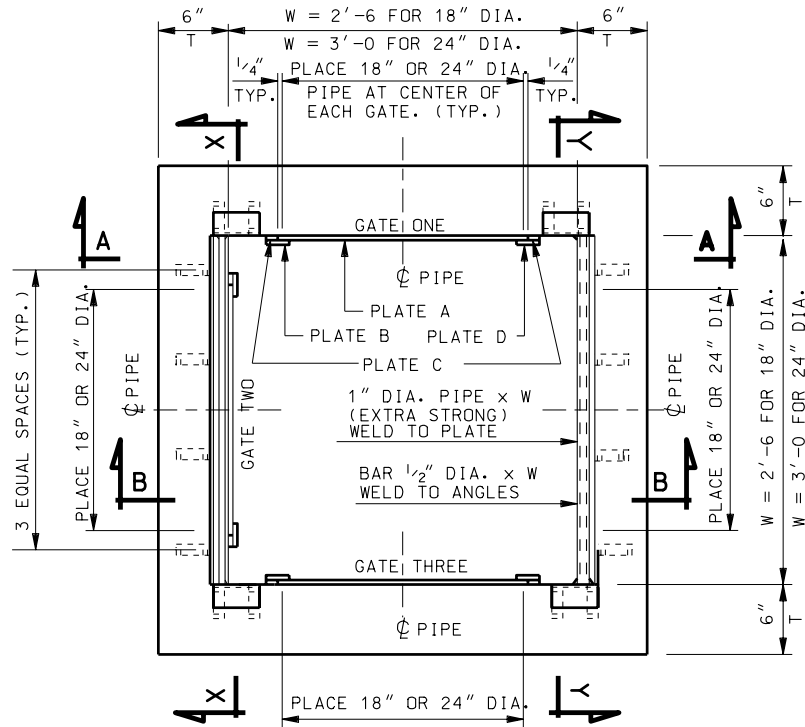
STD DWG DB 1D

STANDARD DRAWING TITLE

REVISIONS

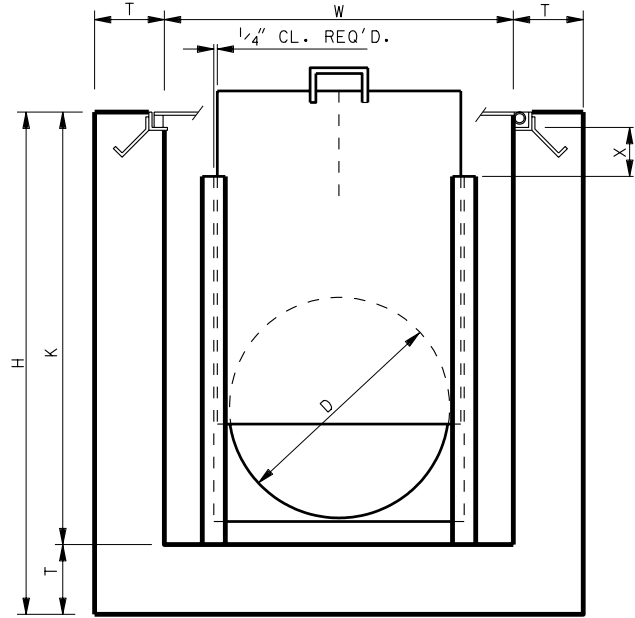
REMARKS

NO. DATE APPR.

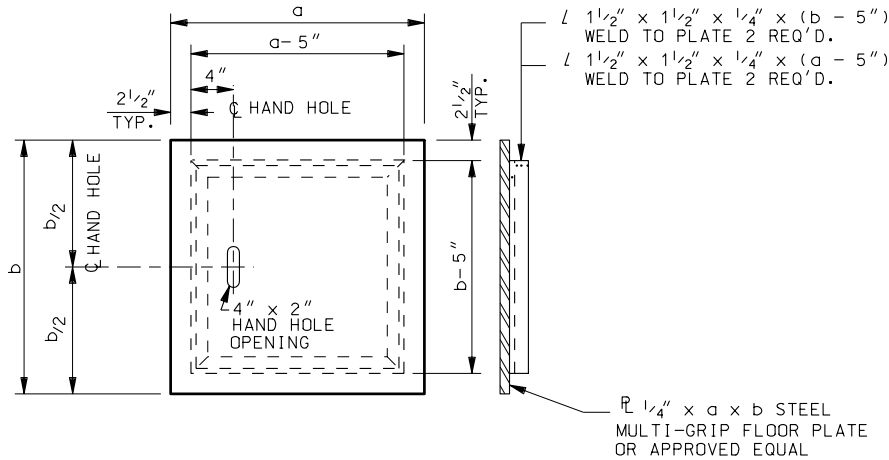


3 GATE PLAN

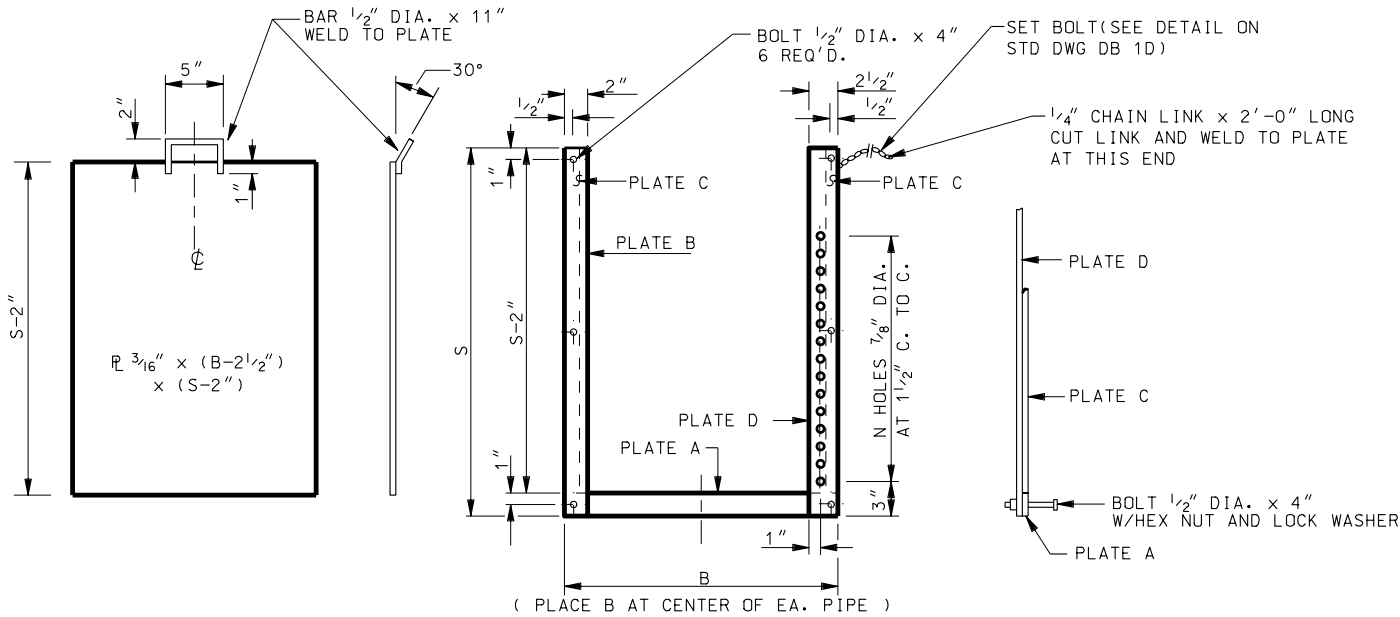
(SECTION X-X Y-Y & B-B ARE ON STD DWG DB 1F)



SECTION A-A



STEEL COVER PLATE DETAILS



FRAME AND GATE INSTALLATION DETAIL
DIMENSIONS AND QUANTITIES

SEE SCHEDULES ON STD DWG DB 1F

REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

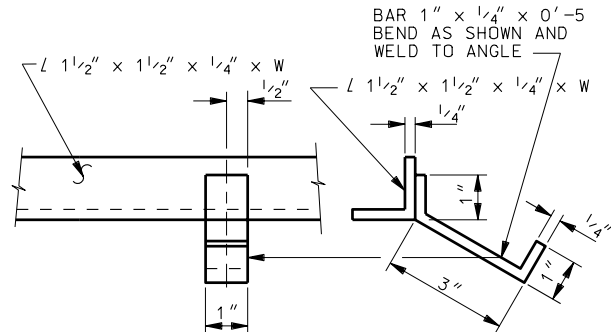
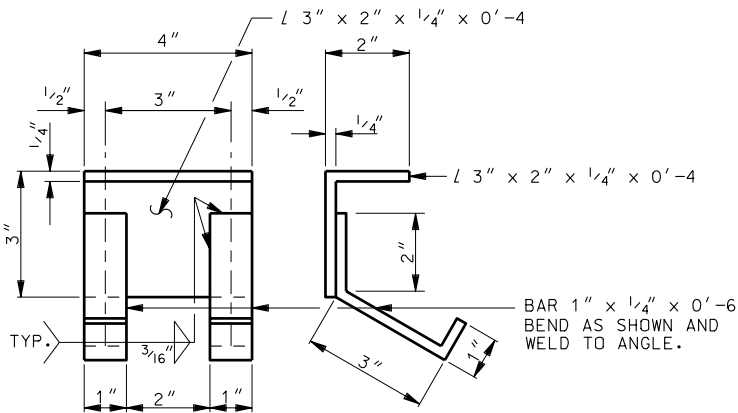
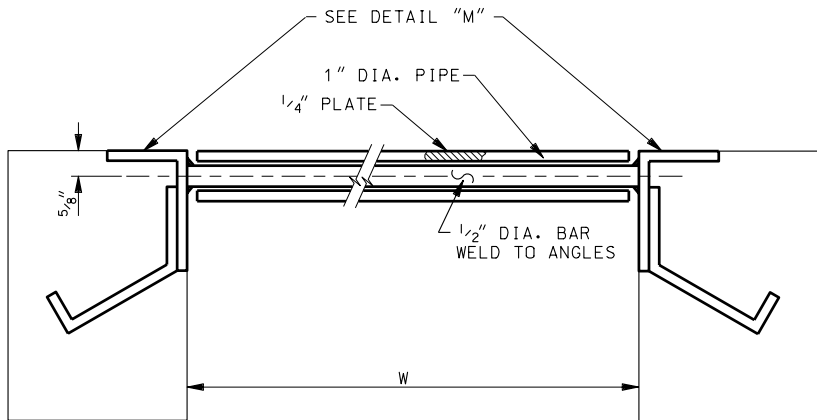
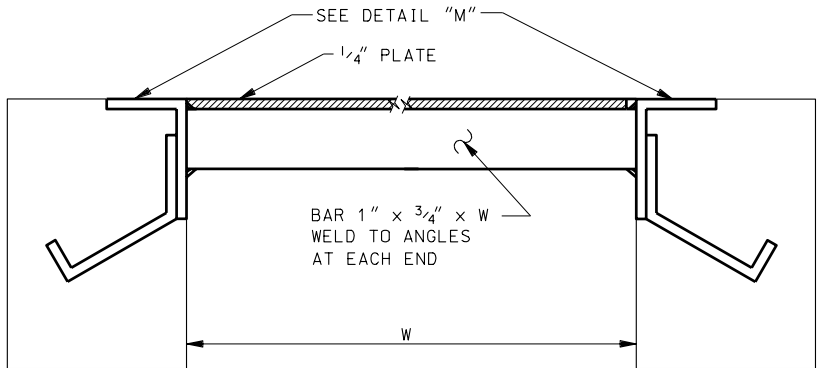
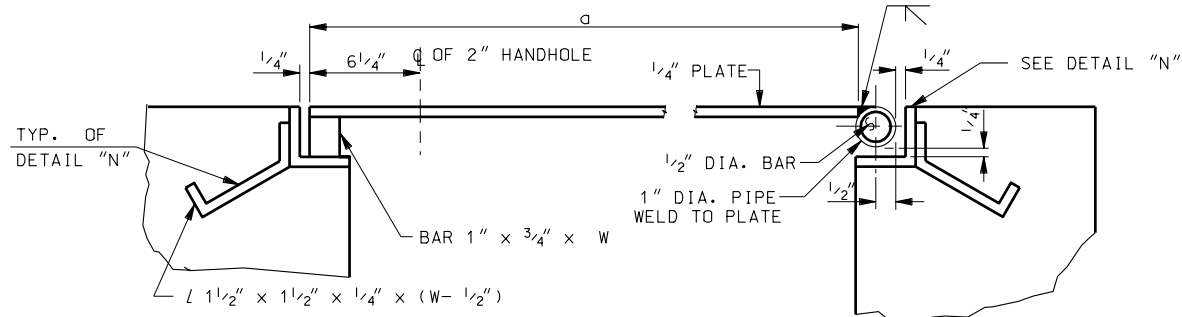
STANDARD DIVERSION
BOX THREE GATE
BOX SECTIONS FOR
18" DIA. OR 24" DIA. PIPE

STD DWG
DB 1E

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR
DATE
JAN. 01, 2005
DATE
JAN. 01, 2005

STANDARD DRAWING TITLE

REMARKS



SCHEDULE NO. 1															
LINE	DIMENSIONS					REINFORCING STEEL				QUANTITIES					
	H	K	W	T	X	A-BARS		B-BARS		REINF. STEEL LB.	CONC. CU. YD.	STRUCTURAL STEEL			
						LENGTH	NO.	LENGTH	NO.			PIPES, BARS & ANGLES lbs.	COVER PLATE lbs.	FRAME lbs.	GATE lbs. EA.
1	2'-6	2'-0	2'-6	6"	Ø	3'-2	12	2'-1	12	66	0.672	31	85	14	25
2	3'-0	2'-6			6"		16	2'-7		85	0.783				
3	3'-6	3'-0			1'-0		16	3'-1		91	0.894				
4	4'-0	3'-6			1'-6		20	3'-7		111	1.005				
5	4'-6	4'-0			2'-0		20	4'-1		117	1.116				
6	5'-0	4'-6			2'-6		24	4'-7		137	1.227				
7	5'-6	5'-0			3'-0		24	5'-1		143	1.338				
8	6'-0	5'-6			3'-6		28	5'-7		163	1.450				
9	6'-6	6'-0			4'-0		28	6'-1		169	1.561				
10	7'-0	6'-6	2'-6	6"	4'-6	3'-2	32	6'-7	12	188	1.672	31	85	14	25
11	3'-0	2'-6	3'-0	6"	Ø	3'-8	16	2'-7	12	94	0.944	35	118	18	41
12	3'-6	3'-0			6"		16	3'-1		100	1.074				
13	4'-0	3'-6			1'-0		20	3'-7		121	1.203				
14	4'-6	4'-0			1'-6		20	4'-1		128	1.333				
15	5'-0	4'-6			2'-0		24	4'-7		150	1.463				
16	5'-6	5'-0			2'-6		24	5'-1		156	1.592				
17	6'-0	5'-6			3'-0		28	5'-7		184	1.722				
18	6'-6	6'-0			3'-6		28	6'-1		183	1.852				
19	7'-0	6'-6			4'-0		32	6'-7		205	1.981				
20	7'-6	7'-0	3'-0	6"	4'-6	3'-8	32	7'-1	12	211	2.111	35	118	18	41

• PLATES A TO D PER GATE

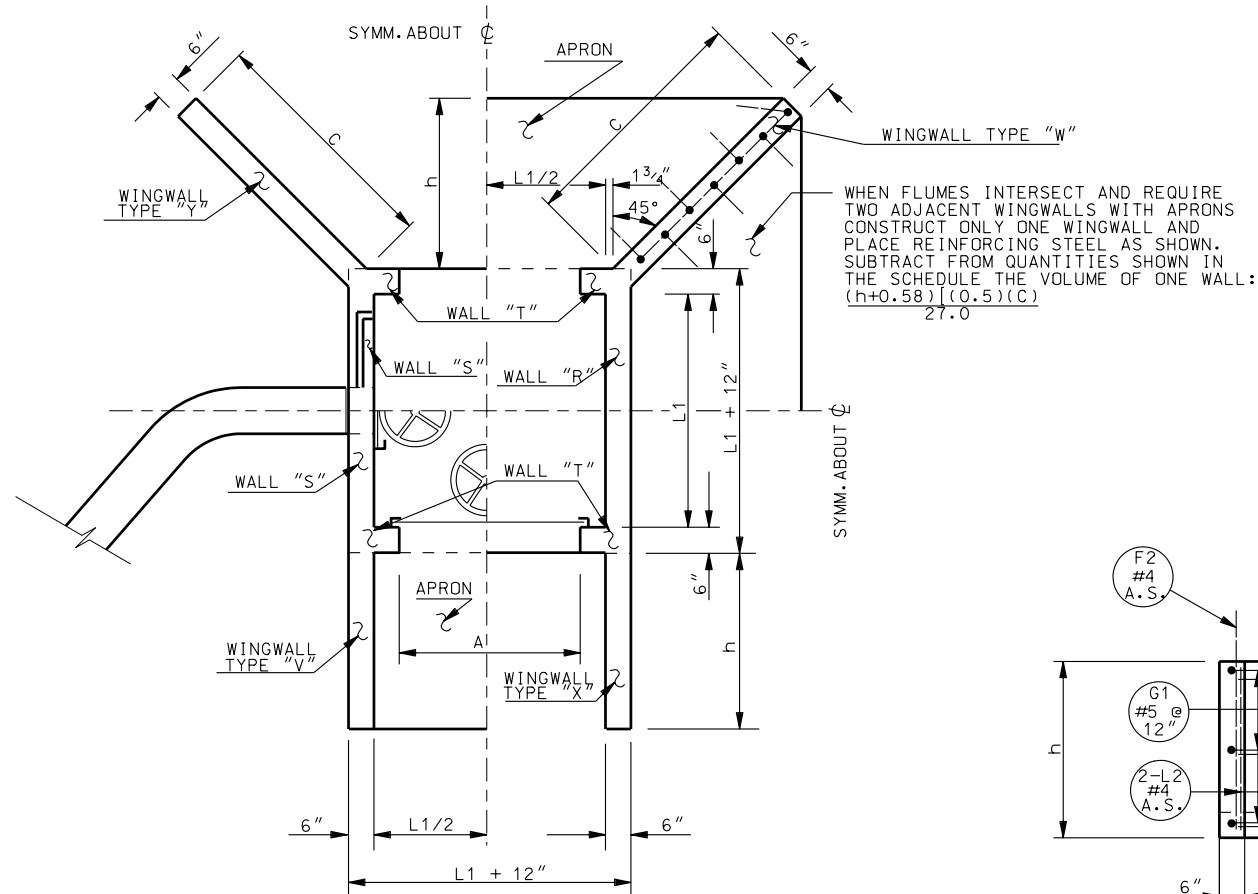
SCHEDULE NO.2									
PIPE SIZE	DIMENSIONS AND QUANTITIES								
	COVER PLATE		FRAME AND GATE						
	D	a	b	B	S	N	PLATE-A 1 EACH	PLATE-B 1 EACH	PLATE-C 2 EACH
18"	2'-7	2'-5 1/2	1'-11	2'-0	12	1/4"x2"x1'-11	1/4"x2"x2'-0	1/4"x1"x1'-10	3/16"x20 1/2"x1'-10
24"	3'-1	2'-11 1/2	2'-5	2'-6	15	1/4"x2"x2'-5	1/4"x2"x2'-6	1/4"x1"x2'-4	3/16"x26 1/2"x2'-4

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

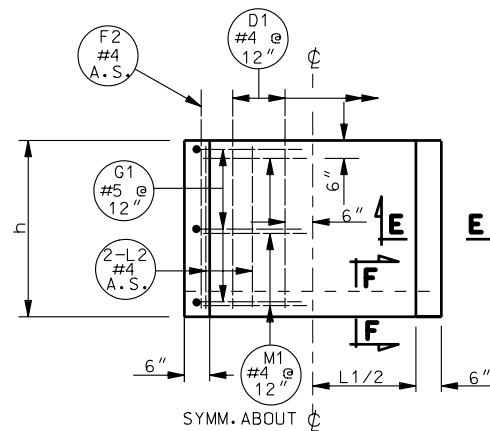
RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

STANDARD DIVERSION
BOX THREE GATE
BOX SECTIONS FOR
18"DIA. OR 24"DIA.PE

STD DWG
DB 1F

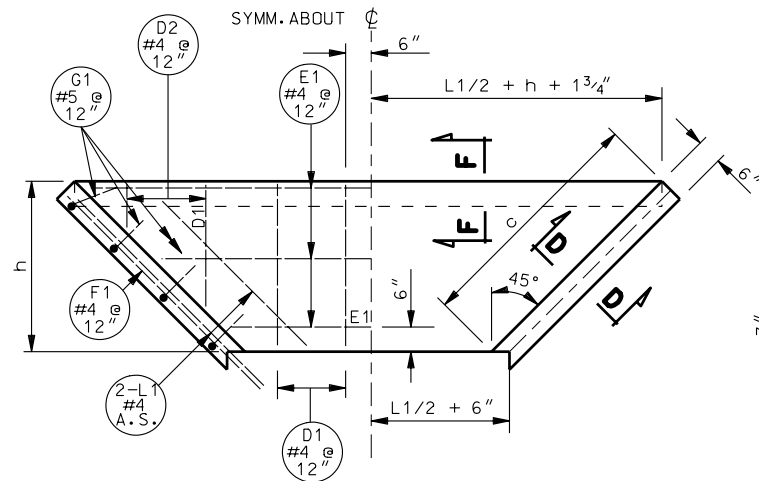


DIVERSION BOX W/INTERCHANGEABLE WALLS
PLAN VIEW

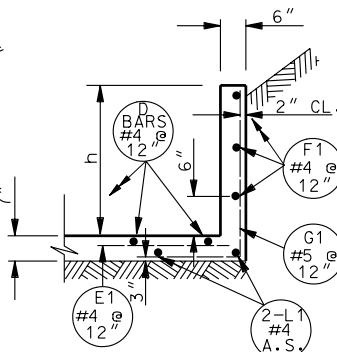


APRON & WINGWALLS TYPE "V"

PROVIDE CUT-OFF WALL ONLY WHEN CALLED FOR IN NOTE.
PROVIDE WHEN SO SPECIFIED, FOR ALL APRONS SHOWN IN NOTE.

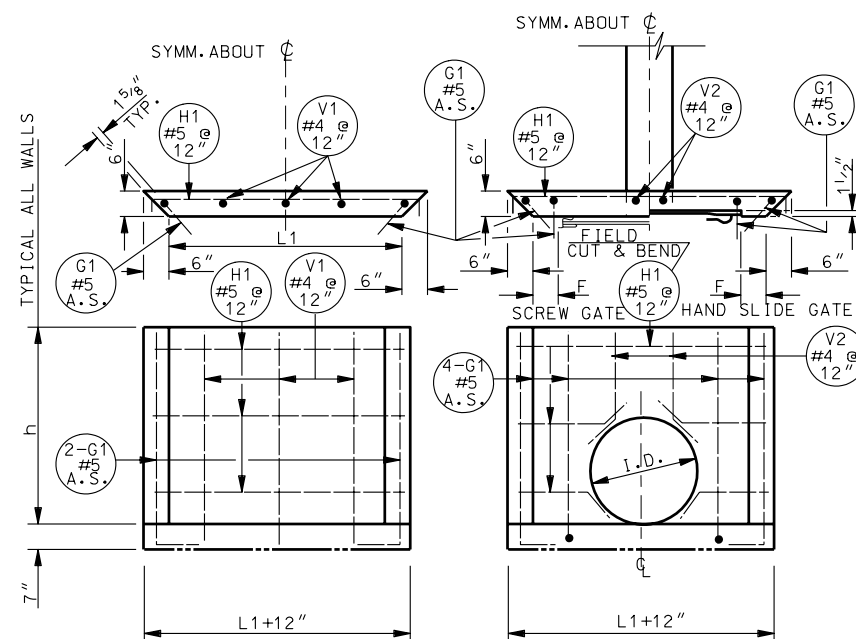


APRON & WINGWALLS TYPE "W"

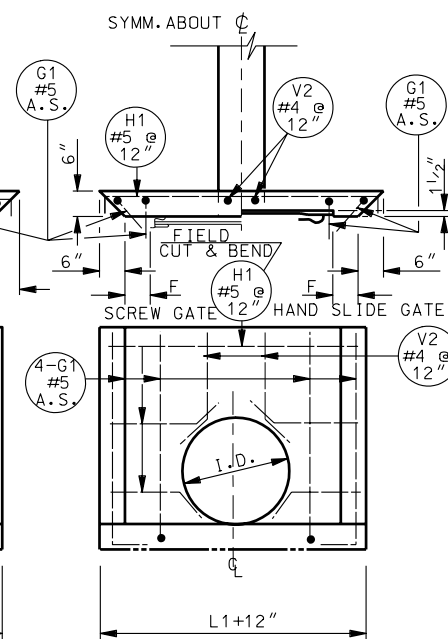


SECTION D-D

APRON & WINGWALLS TYPE "W"

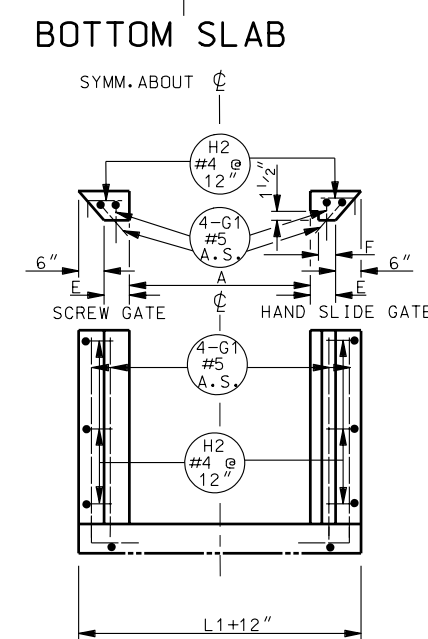


WALL "R"

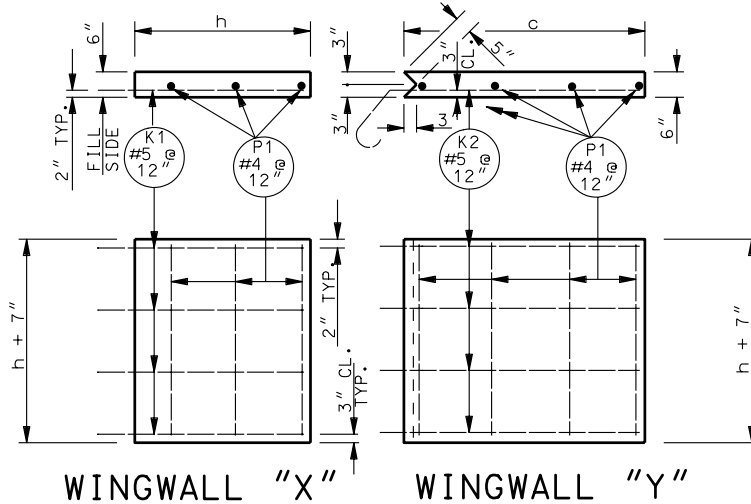


WALL "S"

(PIPE ARCH SIMILAR)

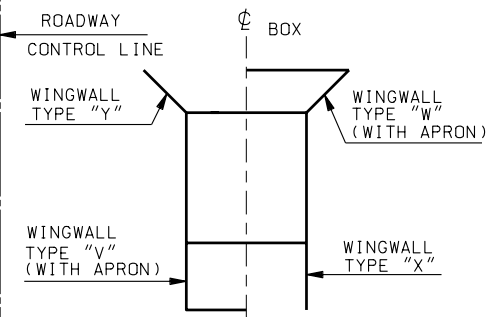


WALL "T"

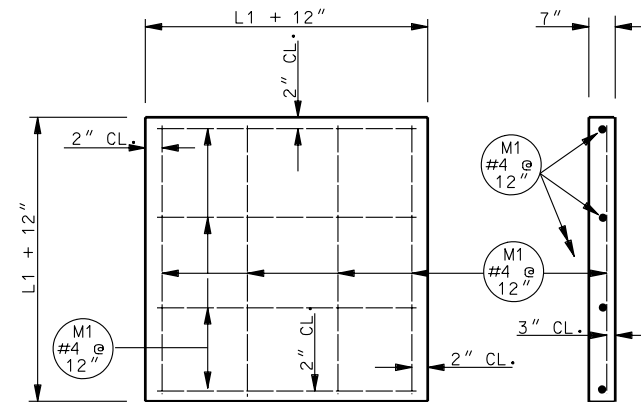


WINGWALL "X" WINGWALL "Y"

- NOTES:**
INTERPRETATION OF SCHEMATIC SKETCH ON
ROADWAY PLAN AND PROFILE SHEET TO INCLUDE:
1. ORIENTATION OF DIVERSION BOX RELATIVE TO
ROADWAY CONTROL LINE.
 2. TYPE OF WALL SPECIFIED FOR EACH BOX WITH
ACCOMPANYING GATE AND CUT-OFF WALL
REQUIREMENTS.
 3. HINGET LID REQUIREMENTS.
 4. FOR GENERAL NOTES SEE STD DWG DB 2B



SCHEMATIC SKETCH
SEE ROADWAY PLAN AND PROFILE SHEET



BOTTOM SLAB

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

STANDARD DIVERSION BOX
W/INTERCHANGEABLE
WALLS, BOTTOM SLAB,
WALLS AND APRON
DETAILS

STD DWG
DB 2A

NO.	DATE	APPR.	REMARKS

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR
JAN.01.2005
DATE
JAN.01.2005
DATE

[illegible]

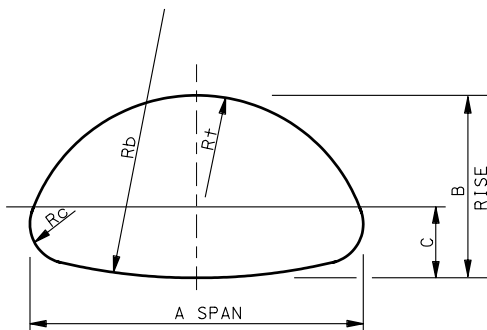
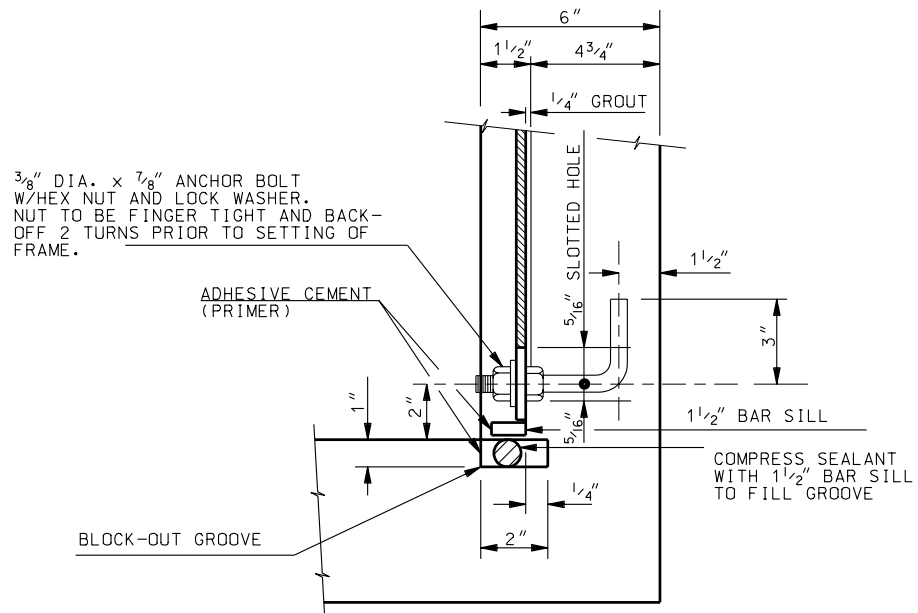
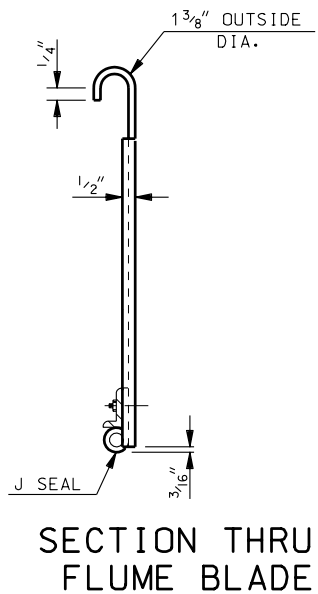
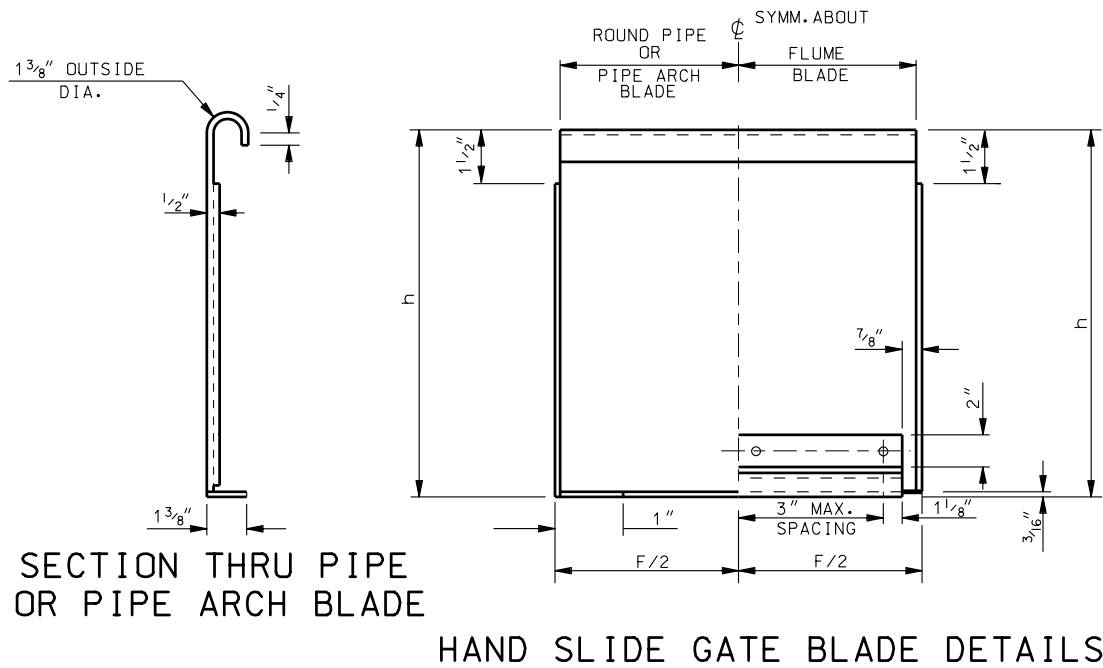
1. FOR TRANSITION STRUCTURE FROM DIVERSION BOX TO TRAPEZOIDAL SHAPED CHANNEL WITH BOTTOM WIDTH OF 1'-0". SEE STD DWG CB 3.
2. ALL DIMENSIONS ARE ROUNDED TO THE NEAREST WHOLE INCH. THOSE DIMENSIONS SHOWN FOR REBAR ARE OUT-TO-OUT OF BAR.
3. WHEN LAYING-OUT SET REBAR, USE "∅" AND "w" DIMENSIONS NOT AVERAGE LENGTH OF REBAR.
4. USE STANDARD 180 DEGREE HOOK FOR K2 BAR AS NOTED.
5. USE #5 REBARS FOR K1, K2, G1 AND H1 MARK NUMBERS. ALL REMAINING MARK NUMBERS ARE #4 REBARS.
6. SAME SIZE BOX IS REQUIRED FOR BOTH METAL PIPE AND CONCRETE PIPE.



1. USE COATED DEFORMED BILLET REINFORCING STEEL BARS CONFORMING TO ASSHTO M 284 OR M 111 AND M 31 GRADE 60 RESPECTIVELY.
2. USE TYPE II CEMENT (LOW ALKALI) AND STRUCTURAL CONCRETE UNLESS SPECIFIED OTHERWISE.
3. CHAMFER ALL EXPOSED CONCRETE CORNERS $\frac{3}{4}$ " EXCEPT WHERE NOTED OTHERWISE.
4. USE CLASS AA(AE) CAST-IN-PLACE CONCRETE EXCEPT WHERE NOTED OTHERWISE, SPECIFIED OTHERWISE.
5. EACH LINE DESCRIBES THE QUANTITIES FOR ONE WALL OR SLAB OF THE TYPE SPECIFIED. USE THIS DRAWING IN CONJUNCTION WITH ROADWAY PLAN AND PROFILE, AND ROADWAY SUMMARY SCHEDULES TO DETERMINE THE SPECIFICS CONCERNING EACH DIVISION BOX.

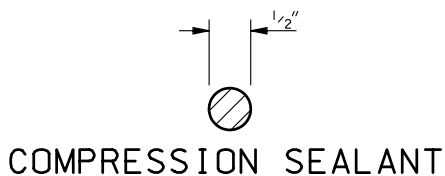
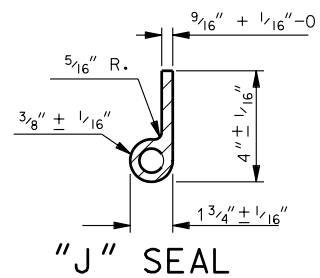
HS-20 OR INTERSTATE ALTERNATE LOADING IN ACCORDANCE WITH
CURRENT AASHTO AND INTERIM SPECIFICATIONS.
CAST-IN-PLACE STRUCTURAL CONCRETE: $F_c = 1,400$ psi $n = 8$
REINF. STEEL: $F_s = 24,000$ psi

15-DEC-2004 DGN: File: N:\\Ead\\Standard Drawings\\Imperial\\2005\\Approved\\Diversions\\Boxes (DB)\\db02.dgn

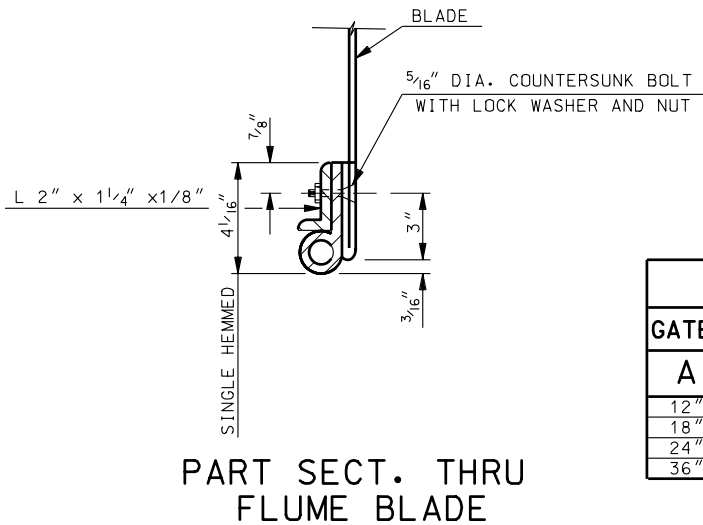


SPAN	RISE	LAYOUT DIMENSIONS			
		C	Rc	Rt	Rb
36"	22"	6 1/4"	5"	18 1/4"	73 1/4"

NOTE: PIPE-ARCH LAYOUT IN SHEET METAL FRAME TO CONFORM TO THESE DIMENSIONS.



FLEXIBLE JOINT SEALANT
TYP. CROSS-SECTION



NOTES:

- USE STRUCTURAL CARBON FOR ALL BAR AND ANGLE STEEL CONFORMING TO AASHTO DESIGNATION M 270, GRADE 36. HOT-DIP GALVANIZE AFTER FABRICATION IN ACCORDANCE WITH AASHTO DESIGNATION M 111.
- FABRICATE GUIDES, BLADES, AND SHEET METAL FRAMES OF HAND SLIDE GATES OF ZINC COATED STEEL CONFORMING TO THE REQUIREMENTS OF SPECIFICATION ASTM A 653.
- "J" SEALS: MOLDED OR EXTRUDED NEOPRENE OR EPDM (ETHYLENE PROPYLENE) OF PROPER LENGTH, CURED TO ENSURE A DENSE HOMOGENEOUS CROSS SECTION FREE FROM PITTING, BLISTERS OR POROSITY, MEETING THE FOLLOWING SPECIFICATIONS WHEN TESTED IN ACCORDANCE WITH APPLICABLE PROVISIONS OF ASTM D 412, D 471, D 2240 AND D 395.

SHORE A DUROMETER HARDNESS-----	60 ± 5
NEOPRENE	EPDM
MINIMUM ELONGATION-----	450% 35%
ULTIMATE TENSILE STRENGTH-----	2,500 psi 2,000 psi
COMPRESSION SET (MAX.)-----	30% 25%

BOTH MATERIALS

ABSORPTION (2 DAYS)-----5% BY WEIGHT
TENSILE STRENGTH (48 HOURS IN OXYGEN 8 PERCENT OF BEGINNING STRENGTH @ 70°C AND 300 PSI PRESSURE.)
ACCURATELY LOCATE AND DRILL ALL HOLES IN SEAL WITH 1/8" OVERSIZE HOLLOW-CORE DRILL.

- COMPRESSION SEALANT: 1 1/2 INCH DIA., TOP GRADE BUTYL RUBBER OF DENSE, HIGHLY COMPRESSIBLE, STABLE MATERIAL WITH GOOD SAG AND ADHESION PROPERTIES PRODUCED FROM BLENDS OF REFINED HYDROCARBON RESINS AND PLASTICIZING COMPOUNDS, REINFORCED WITH INERT MINERAL FILLERS CONTAINING NO SOLVENTS, IRRITATING FUMES OR OBNOXIOUS ODORS NOT DEPENDENT ON OXIDIZING, EVAPORATING OR CHEMICAL ACTION FOR ADHESIVE OR COHESIVE STRENGTH HAVING THE FOLLOWING PROPERTIES:

CHEMICAL COMPOSITION COMPONENTS		MIN.	MAX.	ASTM SPEC.
BITUMEN (HYDROCARBON PLASTIC CONTAIN)	% BY WT.	50	70	D4, D140
INERT MINERAL FILLER	% BY WT.	30	50	D545
VOLATILE MATTER	% BY WT.	2.0		D6

PHYSICAL PROPERTIES		REQUIRED
SPECIFIC GRAVITY @ 77°F (25°C)	-----	1.20 TO 1.35
DUCTILITY @ 77°F 25°C MIN.	-----	5.0 c. m.
SOFTENING POINT @ 77°F MIN.	-----	320°F
FLASH POINT c.o.c. MIN.	-----	600°F
FIRE POINT c.o.c. MIN.	-----	625°F
PENETRATION 77°F (25°C) 150 gs. 5 sec	-----	50 to 120

TESTS:

REJECT IF ONE OR MORE TEST SPECIMENS OF THE LOT REPRESENTING THE SPECIMENT, FAIL TO MEET ASTM REQUIREMENTS

- BOTH FRAMES CAN BE USED WITH TYPE "G" HAND SLIDE GATES. SPECIFY WHETHER TYPE G_a OR G_b FRAME IS REQUIRED. SEE STD DWG DB 2C FOR FRAME TYPES. NORMALLY THE NUMBER OF GATES EQUAL THE NUMBER OF OPENINGS LESS ONE.
- THE RUBBER SEAL FOR FLUSH BOTTOM CLOSURE: CONFORM TO ASTM D 2000.
- MAKE FLUSH WITH FLOOR OF BOX TOP OF BAR SILL AFTER FRAME HAS BEEN PROPERLY PLUMBED AND LEVELED. GROUT FRAME IN PLACE WITH A CEMENT GROUT.

GATE SIZE		FLUME						PIPE OR PIPE ARCH					
A	B	FRAME		GUIDE		BLADE		SHEET METAL FRAME		BLADE		F	GAGE
		D	h	C	GAGE	E	F	GAGE	A	h	D		
12"	12"	1'-4 1/4	1'-9	1'-6 1/2	16	2	1'-1 1/2	16	12"	1'-9	1'-4 1/4	16	1'-1 1/2
18"	18"	1'-10 1/4	2'-3	2'-0 1/2	14	3	1'-7 1/2	14	18"	2'-3	1'-10 1/4	14	1'-7 1/2
24"	24"	2'-4 1/4	2'-9	2'-6 1/4	10	4	2'-1 1/2	10	24"	2'-9	2'-4 1/4	10	2'-1 1/2
36"	24"	3'-5 1/4	2'-7	2'-4 1/2	10	4	3'-1 1/2	8	36"	2'-7	3'-5 1/4	10	3'-1 1/2

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

RECOMMENDED FOR APPROVAL

CHAIRMAN STANDARDS COMMITTEE

APPROVED

DEPUTY DIRECTOR

STANDARD DIVERSION
BOX TYPE "G"
HAND SLIDE GATE
DETAILS

STD DWG
DB 2D

STANDARD DRAWING TITLE



SOLID COVER TYPE "A" SUB-FRAME TYPE "I" DIMENSIONS

REVISIONS

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

RECOMMENDED FOR APPROVAL

SALT LAKE COUNTY, UTAH

CHAIRMAN STANDARDS COMMITTEE

[Signature]

JAN. 01, 2005

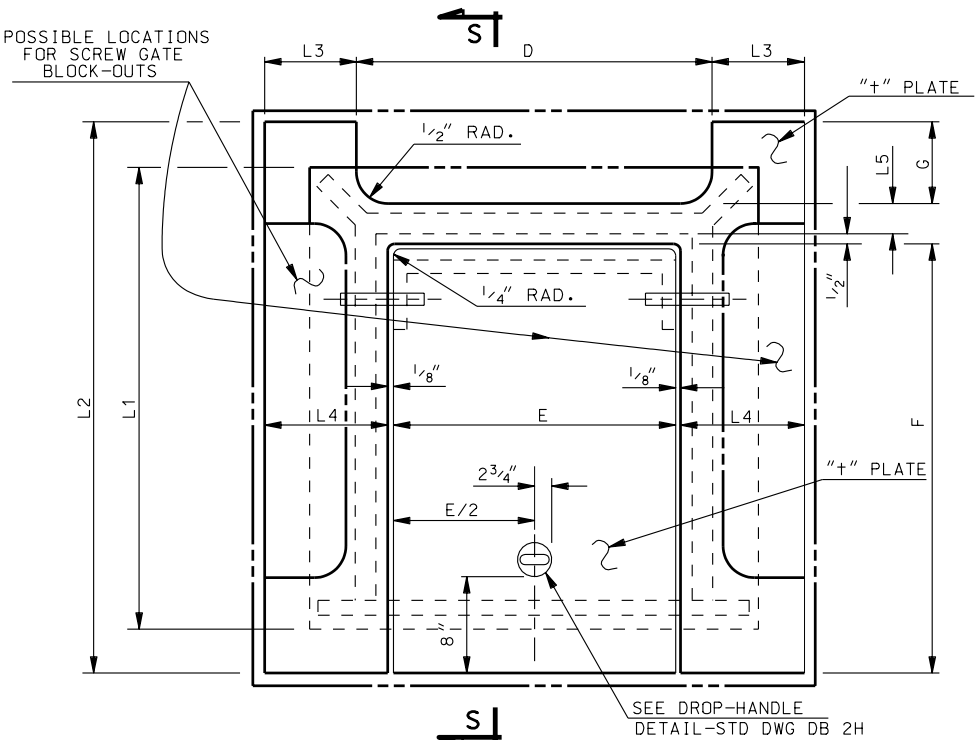
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APPROVED  JAN.01,2005
DEPUTY DIRECTOR DATE

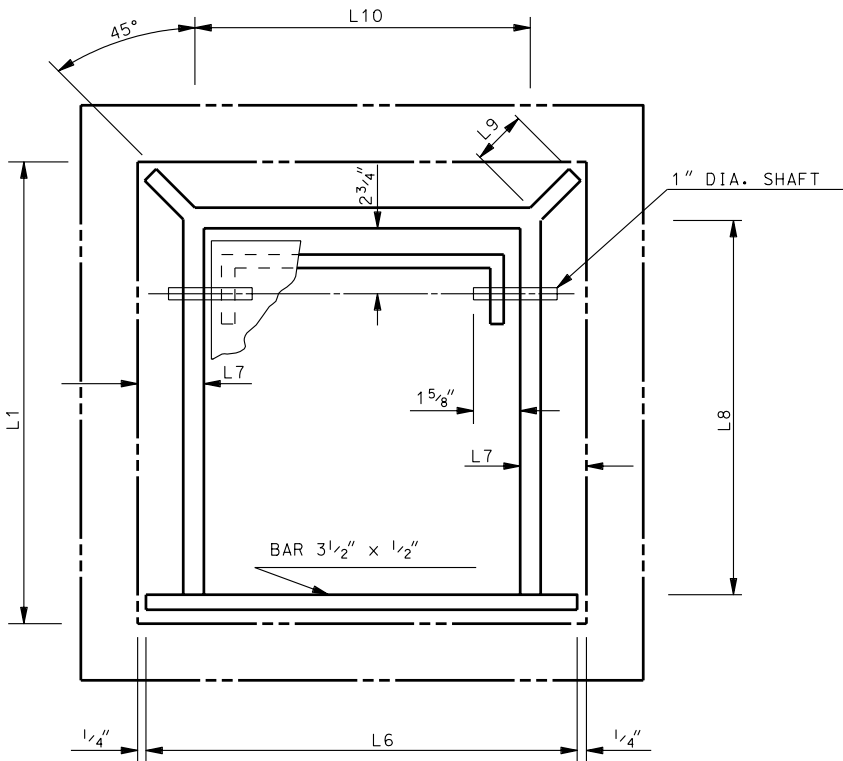
STANDARD DIVERSION BOX
HINGED LID
(SOLID COVER PLATE)
TYPE "A" DETAILS
TYPE I PLAN

STANDARD DRAWING TITLE

STD DWG
DB 2E

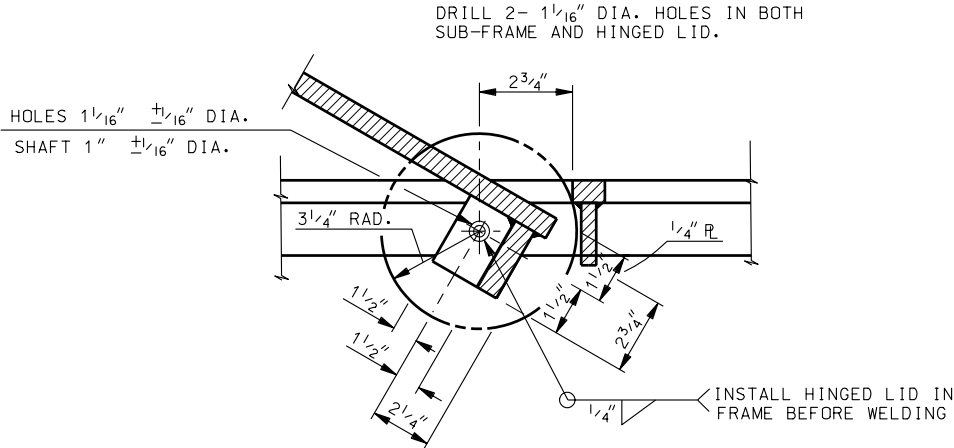


SOLID COVER TYPE "A" DETAILS
PLAN

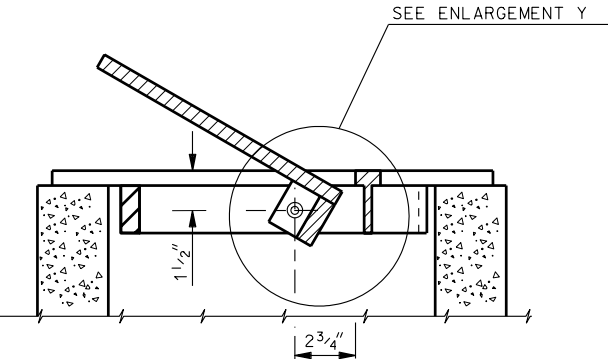


SOLID COVER TYPE "A" DETAILS
SUB-FRAME TYPE II PLAN

SOLID COVER TYPE "A" SUB-FRAME TYPE II DIMENSIONS																		
LINE NO.	SCREW GATE		WALL SIZE	BLOCK-OUT		HINGED LID		COVER PLATE					SUB-FRAME TYPE II					
	A	B		D	G	E	F	+	L2	+	L3	L4	L5	L6	L7	L8	L9	L10
1	18	18	2'-6"	1'-10 1/4"	8 1/2"	1'-8 1/4"	2'-6 1/2"	1/4"	3'-5"	1/4"	9 3/8"	10 1/4"	1 1/2"	2'-5 1/2"	4 3/4"	2'-0 1/2"	4 1/4"	1'-11 1/2"
2	24	24	3'-0"	2'-4 1/4"	8 1/2"	2'-2 1/4"	3'-0 1/2"	1/4"	3'-11"	1/4"	9 3/8"	10 1/4"	1 1/2"	2'-11 1/2"	4 3/4"	2'-6 1/4"	4 1/2"	2'-5 1/8"
3	30	30	3'-10"	2'-11 1/4"	8 1/2"	2'-6"	3'-10 1/2"	1/4"	4'-9"	1/4"	10 1/8"	1'-13 3/8"	1 1/2"	3'-9 1/2"	7 1/8"	3'-4 1/4"	4 1/2"	3'-3 1/8"



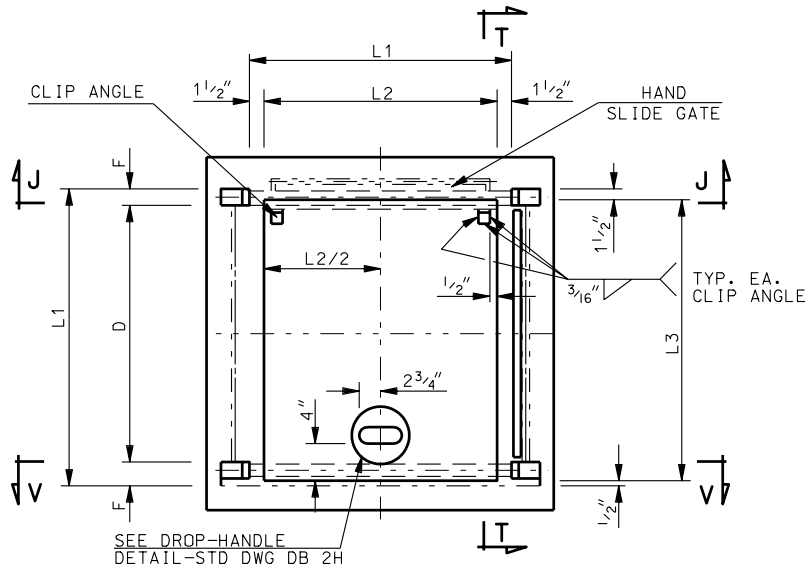
ENLARGEMENT Y



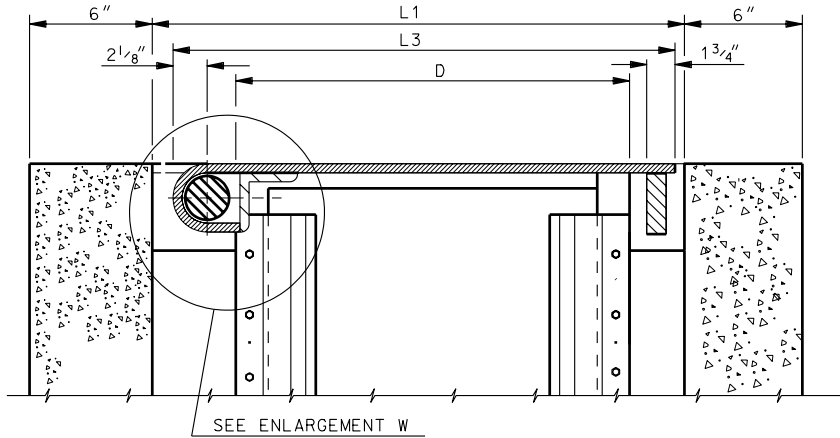
SECTION S-S

USE BAR 3 1/2" x 1/2" DIA. FOR ALL MEMBERS OF SUB-FRAME EXCEPT AS NOTED.

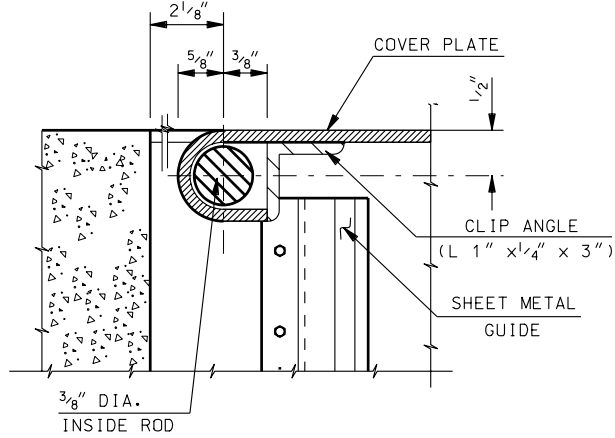
STANDARD DIVERSION BOX HINGED LID (SOLID COVER PLATE) TYPE "A" DETAILS TYPE II PLAN		STANDARD DRAWING TITLE	
UTAH DEPARTMENT OF TRANSPORTATION STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION		REVISIONS	
RECOMMENDED FOR APPROVAL SALESMAN JAN.01.2005 DATE		APPROVED CHAIRMAN STANDARDS COMMITTEE JAN.01.2005 DATE	
DEPUTY DIRECTOR		REMARKS	
NO.		DATE	
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DATE		DATE	
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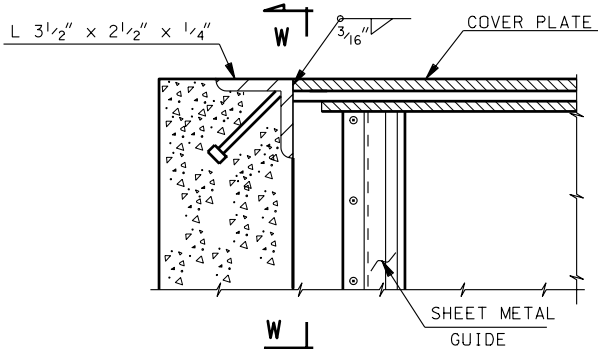
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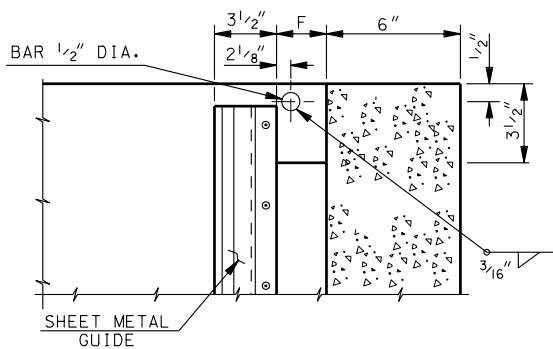
SECTION T-T



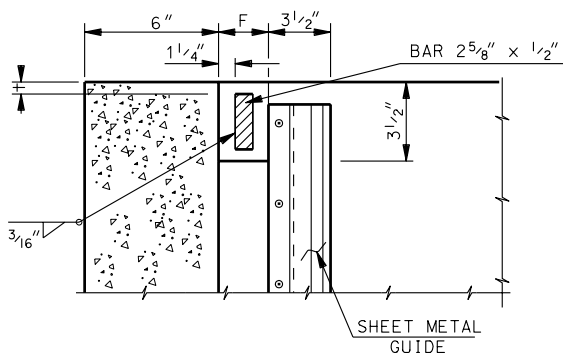
ENLARGEMENT W



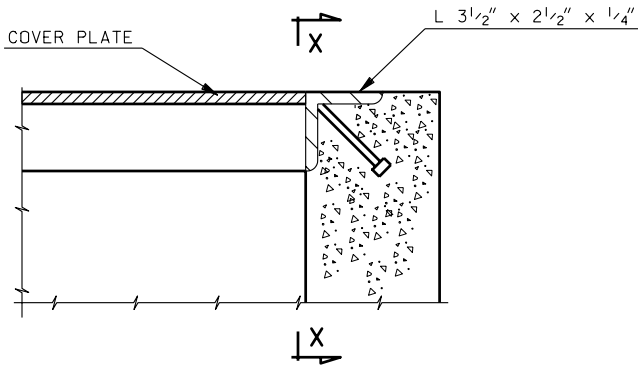
SECTION J-J



SECTION W-W



SECTION X-X



SECTION V-V

SOLID COVER TYPE "B" DETAILS

NOTES:

1. PREFORMED JOINT MATERIAL: AASHTO DESIGNATION M 213
2. ALL STRUCTURAL STEEL EITHER STRUCTURAL CARBON STEEL CONFORMING TO AASHTO DESIGNATION M 270, GRADE 36 OR A RAISED PATTERN CARBON STEEL (U.S. STEEL S 300) OR USED IN SIDEWALK LOCATIONS ONLY.
3. HOT DIP GALVANIZE HINGED LID SOLID COVERS AFTER FABRICATION IN ACCORDANCE WITH AASHTO DESIGNATION M 111 (ASTM A 123).
4. WHEN HINGED LID IS PLACED IN SIDEWALK LOCATIONS, PROVIDE A RUBBED FINISH FOR ALL BEARING SURFACES AT TOP OF WALL. AT THE DISCRETION OF THE ENGINEER, RECESS THE COVER PLATE THE THICKNESS OF THE COVER PLATE AND USE A CEMENT GROUT ON ALL BEARING SURFACES TO LEVEL THE HINGED LID.
5. DO NOT USE THIS DRAWING IN ROADWAY APPLICATIONS WHERE THE HINGED LID IS SUBJECTED TO A WHEEL LOAD.
6. AUTOMATICALLY END WELD THE 1/2" x 4 1/8" H4-L NELSON CONCRETE ANCHOR TO THE FILLET OF THE ANGLE. CENTER ANCHOR ABOUT FILLET.

DESIGN DATA

THE DESIGN IS IN ACCORDANCE WITH CURRENT AASHTO AND INTERIM SPECIFICATIONS.
LOADING - COVER PLATES ARE DESIGNED FOR A LOAD OF 600 lbs/sq ft
Fs=20,000 psi

SOLID COVER TYPE "B" DIMENSIONS									
LINE NO.	HAND SLIDE GATE		WALL SIZE	COVER PLATE					
	A	B		L1	D	F	L2	L3	+
1	12	12	2'-0	1'-4 1/4	3"	1'-9	1'-10	1'-4	1/4"
2	18	18	2'-6	1'-10 1/4	3"	2'-3	2'-4	2'-4	1/4"
3	24	24	3'-0	2'-4 1/4	3"	2'-9	2'-10	2'-10	1/4"
4	36	24	4'-4	3'-5 1/4	5"	4'-1	4'-2	4'-2	1/4"

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR
JAN.01.2005
DATE
JAN.01.2005
DATE

STANDARD DIVERSION BOX
HINGED LID SOLID COVER
TYPE "B" DETAILS

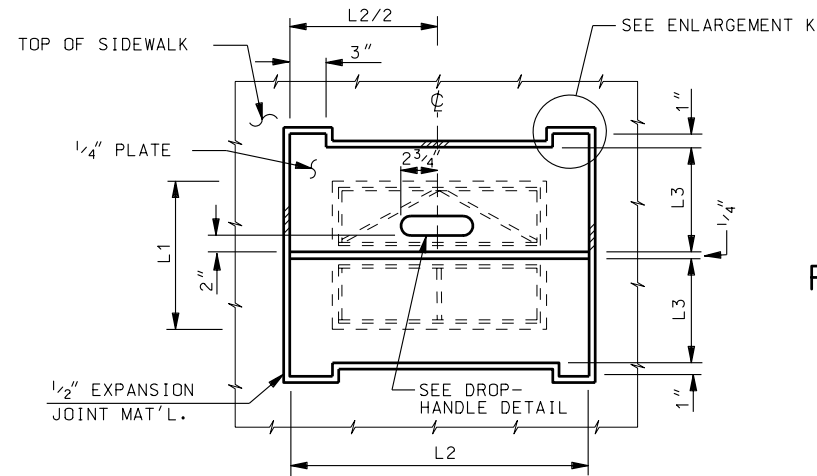
STD DWG
DB 2G

STANDARD DRAWING TITLE

REMARKS

NO. DATE APPR.

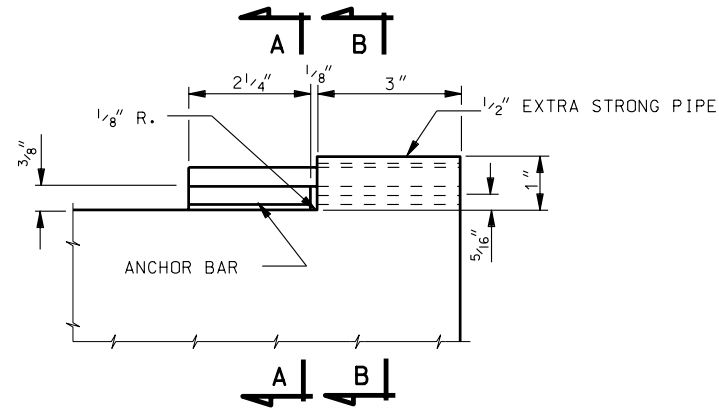
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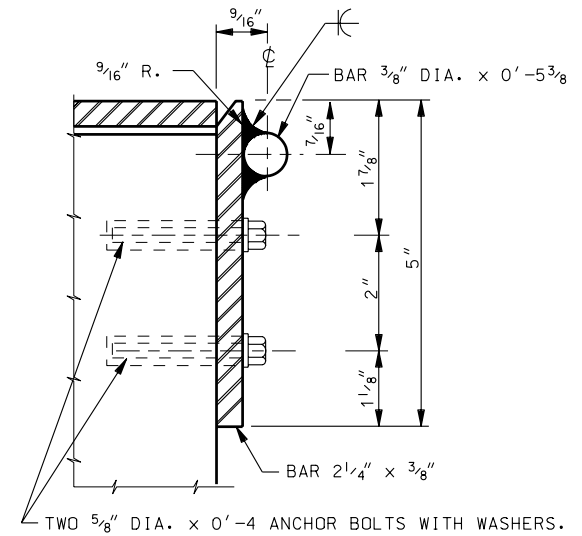
PLAN

PARTIAL SECTION

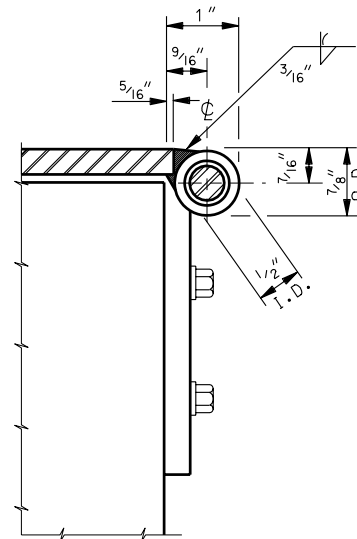
PAINT THIS SIGN ON COVER PLATE AFTER FABRICATION WITH LETTERS 2" IN HEIGHT: "RAISE COVER PLATE TO CHANGE GATES"



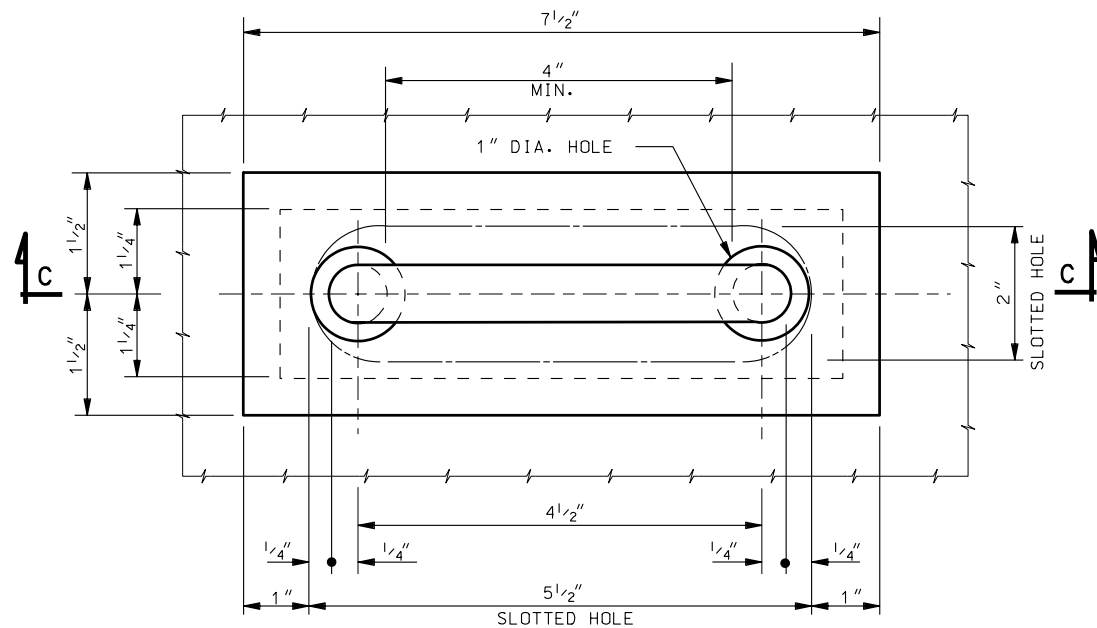
ENLARGEMENT K



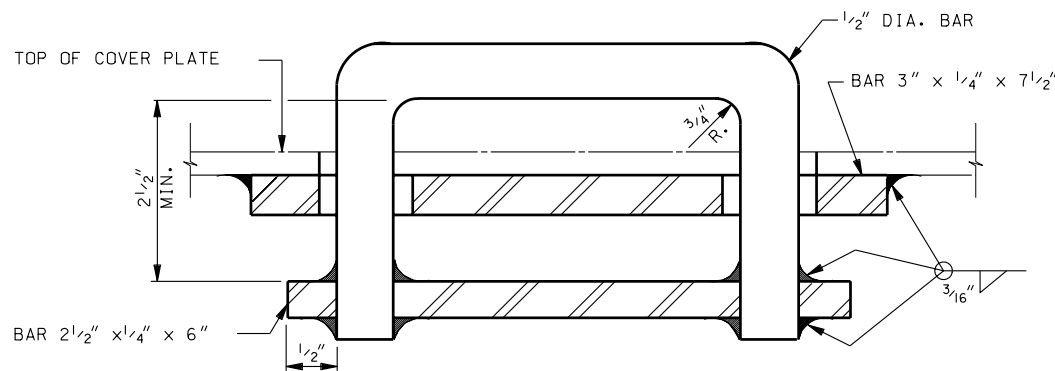
SECTION A-A



SECTION B-B



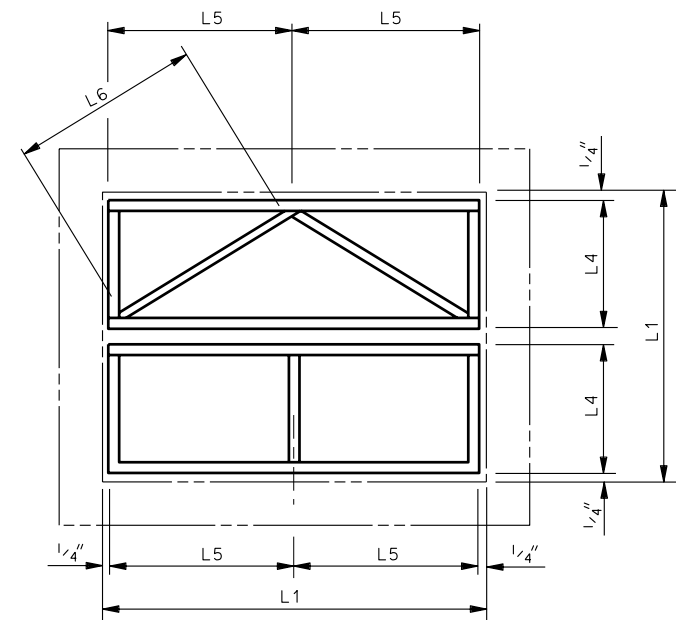
PLAN



SECTION C-C
DROP HANDLE DETAIL

REQUIRE EITHER ONE DROP-DOWN HANDLE IF LOCATED IN SIDEWALK OR A SLOTTED HAND HOLE 2\"/>

SOLID COVER TYPE 'C' SUB-FRAME TYPE III DIMENSIONS										
LINE NO.	HAND SLIDE GATE		WALL SIZE	COVER PLATE			SUB-FRAME TYPE III			
	A	B		L1	L2	L3 +	L4	L5	L6	BAR SIZE
1	12	12	2'-0	3'-0	1'-5 7/8	1/4"	---	---	---	---
2	18	18	2'-6	3'-6	1'-8 7/8	1/4"	---	---	---	---
3	24	24	3'-0	4'-0	1'-11 7/8	3/16"	1'-4 3/4	1'-5 3/4	1'-11	3 1/2 x 1/2
4	36	36	4'-4	5'-4	2'-1 7/8	3/16"	2'-0 3/4	2'-1 3/4	2'-10 1/4	3 1/2 x 1/2



SUB-FRAME TYPE III

REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

STANDARD DIVERSION BOX
HINGED LID
SOLID COVER
TYPE 'B' AND 'C' DETAILS

STD DWG
DB 2H

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

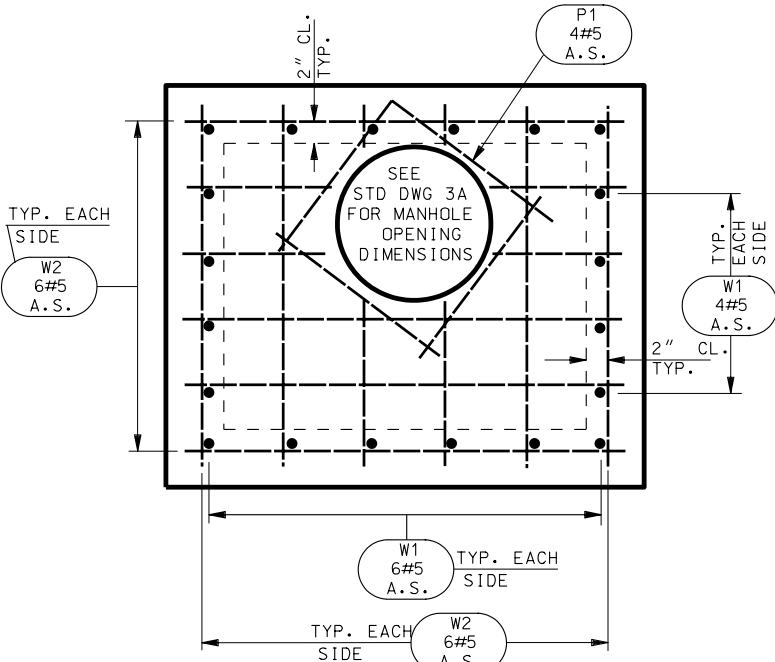
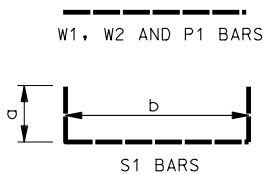
JAN.01.2005
DATE
JAN.01.2005
DATE

REMARKS

NO. DATE APPR.

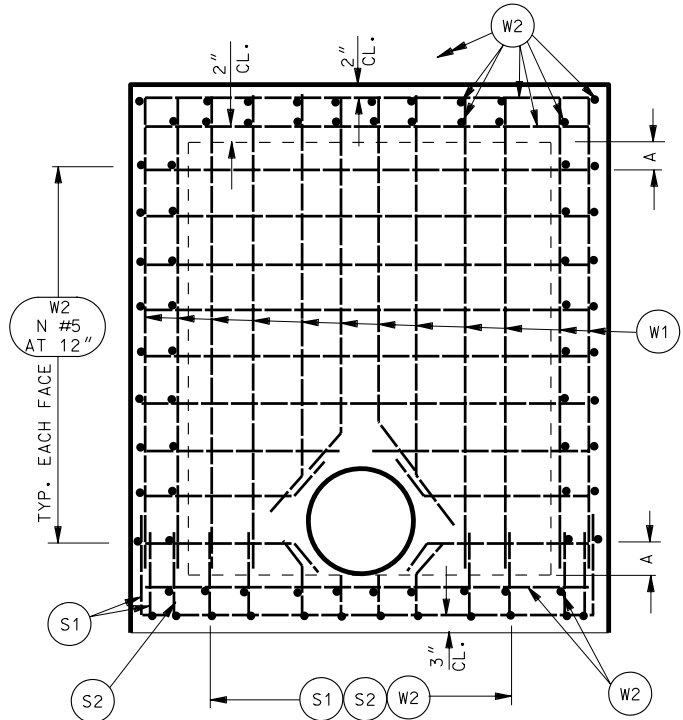
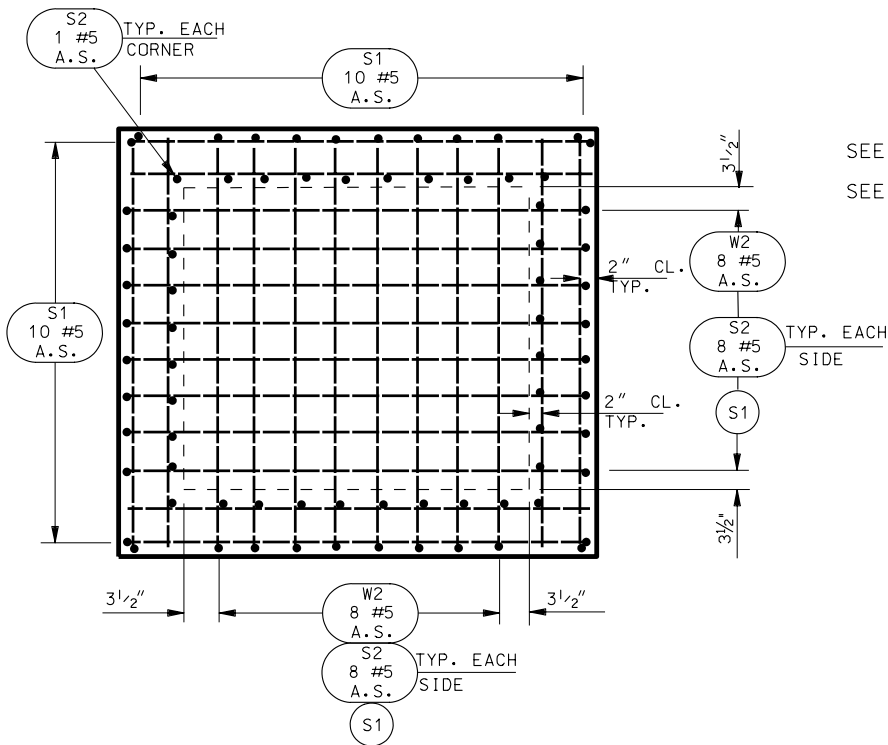
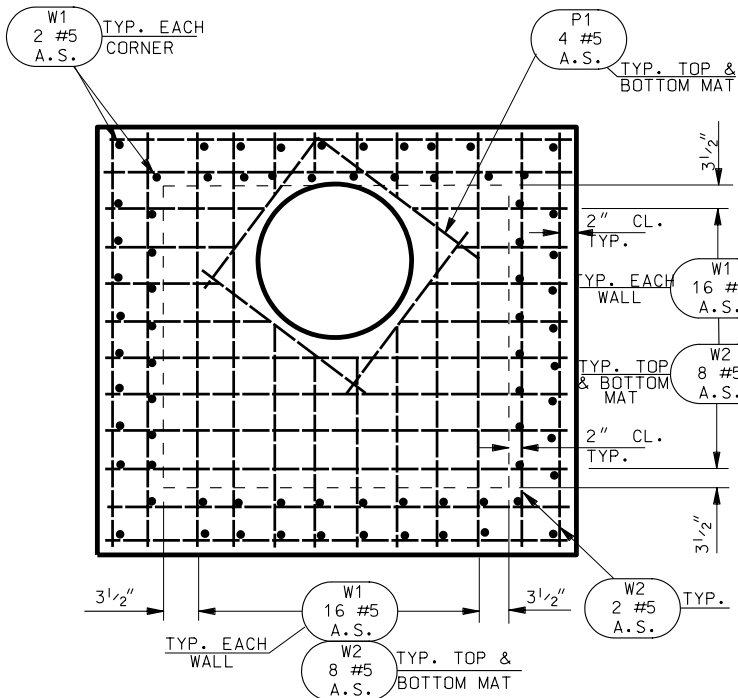
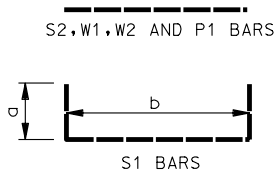
SCHEDULE OF INSTALLATION																									
LINE	DIMENSIONS							REINFORCING STEEL										QUANTITIES			LINE				
	H	W	T	A	MAX. PIPE DIA.			S1		W1		W2		P1		MAN STEP	CONC.	REINF. STEEL	FRAME COVER						
					RCP	CMP	α	β	L' GTH	QT	L' GTH	QT	N	L' GTH	QT					L' GTH		QT			
1	4'-0	5'-0	8"	10"	15"	18"	18"	4'-0	7'-0	12	3'-0	20	2	4'-8	20	3'-6	4	2	2.255	262.1	245	1			
2	4'-4	5'-0	▲	6"	18"	21"	▲	4'-0	7'-0	▲	3'-4	▲	3	4'-8	24	▲	▲	2	2.397	288.6	▲	2			
3	4'-8	5'-0		8"	24"	24"		4'-0	7'-0		3'-8	▲	3	4'-8	24			2	2.540	295.5		3			
4	5'-0	6'-0		10"	24"	30"		5'-0	8'-0		4'-0		3	5'-8	24			3	3.588	340.0		4			
5	5'-4	▲		6"	27"	36"	▲	▲	▲	▲	4'-4	4	▲	28				3	3.764	370.6		5			
6	5'-8			8"	30"	36"					4'-8	4	▲	28				3	3.939	377.6		6			
7	6'-0			10"	36"	42"					5'-0	4		28				4	4.115	384.5		7			
8	6'-4			6"	36"	48"					5'-4	5		32				4	4.290	415.1		8			
9	6'-8			8"	42"	48"					5'-8	5		32				4	4.466	422.1		9			
10	7'-0			10"	▲	54"					6'-0	5		32				5	4.641	429.0		10			
11	7'-4			6"		▲					6'-4	6		36				5	4.817	459.6		11			
12	7'-8			8"							6'-8	6		36				5	4.993	466.6		12			
13	8'-0			10"							7'-0	6		36				6	5.168	473.5		13			
14	8'-4			6"							7'-4	7		40				6	5.344	504.1		14			
15	8'-8			8"							7'-8	7		40				6	5.519	511.1		15			
16	9'-0			10"							8'-0	7		40				7	5.695	518.0		16			
17	9'-4			6"							8'-4	8		44				7	5.871	548.6		17			
18	9'-8			8"							8'-8	8		44				7	6.046	555.6		18			
19	10'-0			10"							9'-0	8		44				8	6.223	562.5		19			
20	10'-4			6"							9'-4	9		48				8	6.397	593.1		20			
21	10'-8			8"							9'-8	9		48				8	6.573	600.1		21			
22	11'-0			10"							10'-0	9		48				9	6.748	607.0		22			
23	11'-4			6"							10'-4	10		52				9	6.924	637.6		23			
24	11'-8			8"							10'-8	10		52				9	7.100	644.6		24			
25	12'-0			10"							11'-0	10		52				10	7.275	651.5		25			
26	12'-4			6"							11'-4	11		56				10	7.451	682.1		26			
27	12'-8			8"							11'-8	11		56				10	7.626	689.1		27			
28	13'-0			10"							12'-0	11		56				11	7.802	696.0		28			
29	13'-4			6"							12'-4	12		60				11	7.978	726.6		29			
30	13'-8			8"							12'-8	12		60				11	8.153	733.6		30			
31	14'-0			10"							13'-0	12		60				12	8.329	740.5		31			
32	14'-4			6"							13'-4	13		64				12	8.504	771.1		32			
33	14'-8			8"							13'-8	13		64				12	8.680	778.1		33			
34	15'-0			10"							14'-0	13		64				13	8.855	785.0		34			
35	15'-4			6"							14'-4	14		68				13	9.031	815.6		35			
36	15'-8			8"							14'-8	14		68				13	9.206	822.6		36			
37	16'-0			10"							15'-0	14		68				14	9.382	829.5		37			
38	16'-4			6"							15'-4	15		72				14	9.558	860.1		38			
39	16'-8			8"							15'-8	15		72				14	9.733	867.1		39			
40	17'-0			10"							16'-0	15		72				15	9.909	874.0		40			
41	17'-4			6"							16'-4	16		76				15	10.084	904.6		41			
42	17'-8			8"							16'-8	16		76				15	10.260	911.6		42			
43	18'-0			10"							17'-0	16		76				16	10.436	918.5		43			
44	18'-4			6"							17'-4	17		80				16	10.611	949.1		44			
45	18'-8			8"							17'-8	17		80				16	10.787	956.1		45			
46	19'-0			10"							18'-0	17		80				17	10.962	963.0		46			
47	19'-4			6"							18'-4	18		84				17	11.138	993.6		47			
48	19'-8			8"							18'-8	18		84				17	11.314	1000.6		48			
49	20'-0			10"							19'-0	18		84				18	11.489	1007.5		49			
50	20'-4			6"							19'-4	19		88				18	11.665	1038.1		2*			
51	20'-8			8"							19'-8	19		88				18	11.840	1045.1		51			
52	21'-0			10"							20'-0	19		88				19	12.016	1052.0		52			
53	21'-4			6"							20'-4	20		92				19	12.192	1082.6		53			
54	21'-8			8"							20'-8	20		92				19	12.367	1089.6		54			
55	22'-0			10"							21'-0	20		92				20	12.543	1096.5		55			
56	22'-4			6"							21'-4	21		96				20	12.718	1127.1		56			
57	22'-8			8"							21'-8	21		96				20	12.894	1134.1		57			
58	23'-0			10"							22'-0	21		96				21	13.069	1141.0		58			
59	23'-4			6"							22'-4	22		100				21	13.245	1171.6		59			
60	23'-8			8"							22'-8	22		100				21	13.421	1178.6		60			
61	24'-0			10"							23'-0	22		100				22	13.596	1185.5		61			
62	24'-4			6"							23'-4	23		104				22	13.772	1216.1		62			
63	24'-8	▼	▼	8"	▼	▼	▼	▼	▼	▼	23'-8	23		104	▼	▼	▼	22	13.947	1223.1	▼	63			
64	25'-0	6'-0	8"	10"	42"	54"	18"	5'-0	8'-0	12	24'-0	20	23	5'-8	104	3'-6	4	23	14.123	1230.0	245	64			

TABLE "A"			
RCP		CMP	
DIA.	CU. YDS.	DIA.	CU. YDS.
12"	0.037	12"	0.019
15"	0.053	15"	0.030
18"	0.071	18"	0.044
21"	0.095	21"	0.059
24"	0.121	24"	0.078
27"	0.151	30"	0.121
30"	0.184	36"	0.175
33"	0.221	42"	0.238
36"	0.261	48"	0.310
42"	0.350	54"	0.393

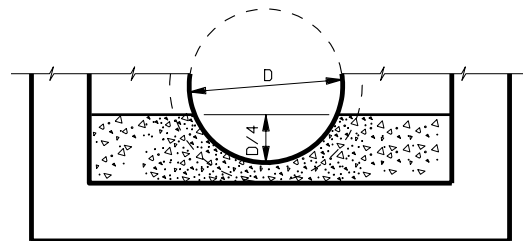


SCHEDULE OF INSTALLATION																											
LINE	DIMENSIONS						REINFORCING STEEL														QUANTITIES				LINE		
	H	W	T	A	MAX. PIPE DIA.		S1				S2		W1		W2		P1		MAN STEP	CONC.	REINF. STEEL LBS.	FRAME COVER LBS.					
					RCP	CMP	a	b	LGTH	QT	LGTH	QT	LGTH	QT	N	LGTH	QT	LGTH					QT				
65	8'-0	9'-0	10"	8"	48"	60"	2'-0	8'-8	12'-8	20	2'-0	36"	7'-0	72	6	8'-8	108	3'-6	8	5	11.234	1870.4	245	65			
66	8'-4	▲	▲	10"	54"	66"	▲	▲	▲	▲	▲	▲	7'-4	▲	6	▲	108	▲	▲	▲	6	11.570	1895.5	▲	66		
67	8'-8			6"	60"	72"							7'-8		7		116			5	11.906	1992.8		67			
68	9'-0				8"	60"							8'-0		7		116			6	12.242	2017.9		68			
69	9'-4			10"	66"	78"							8'-4		7		116			6	12.578	2042.9		69			
70	9'-8			6"	66"	84"							8'-8		8		124			7	12.914	2140.2		70			
71	10'-0			8"	72"	▲							9'-0		8		124			7	13.250	2165.3		71			
72	10'-4			10"	▲								9'-4		8		124			7	13.586	2190.3		72			
73	10'-8			6"									9'-8		9		132			8	13.922	2287.6		73			
74	11'-0			8"									10'-0		9		132			8	14.258	2312.7		74			
75	11'-4			10"									10'-4		9		132			8	14.594	2337.7		75			
76	11'-8			6"									10'-8		10		140			9	14.931	2435.1		76			
77	12'-0			8"									11'-0		10		140			9	15.266	2460.1		77			
78	12'-4			10"									11'-4		10		140			9	15.602	2485.1		78			
79	12'-8			6"									11'-8		11		148			10	15.938	2582.5		79			
80	13'-0			8"									12'-0		11		148			10	16.274	2607.5		80			
81	13'-4			10"									12'-4		11		148			10	16.610	2632.5		81			
82	13'-8			6"									12'-8		12		156			11	16.946	2729.9		82			
83	14'-0			8"									13'-0		12		156			11	17.282	2754.9		83			
84	14'-4			10"									13'-4		12		156			11	17.618	2779.9		84			
85	14'-8			6"									13'-8		13		164			12	17.954	2877.3		85			
86	15'-0			8"									14'-0		13		164			12	18.290	2902.3		86			
87	15'-4			10"									14'-4		13		164			12	18.626	2927.3		87			
88	15'-8			6"									14'-8		14		172			13	18.962	3024.7		88			
89	16'-0			8"									15'-0		14		172			13	19.298	3049.7		89			
90	16'-4			10"									15'-4		14		172			13	19.634	3074.7		90			
91	16'-8			6"									15'-8		15		180			14	19.970	3172.1		91			
92	17'-0			8"									16'-0		15		180			14	20.306	3197.1		92			
93	17'-4			10"									16'-4		15		180			14	20.642	3222.1		93			
94	17'-8			6"									16'-8		16		188			15	20.978	3319.5		94			
95	18'-0			8"									17'-0		16		188			15	21.314	3344.5		95			
96	18'-4			10"									17'-4		16		188			15	21.650	3369.5		96			
97	18'-8			6"									17'-8		17		196			16	21.986	3466.9		97			
98	19'-0			8"									18'-0		17		196			16	22.322	3491.9		98			
99	19'-4			10"									18'-4		17		196			16	22.658	3516.9		99			
100	19'-8			6"									18'-8		18		204			17	22.994	3614.3		100			
101	20'-0			8"									19'-0		18		204			17	23.330	3639.3		101			
102	20'-4			10"									19'-4		18		204			17	23.666	3664.3		102			
103	20'-8			6"									19'-8		19		212			18	24.002	3761.7		103			
104	21'-0			8"									20'-0		19		212			18	24.338	3786.7		104			
105	21'-4			10"									20'-4		19		212			18	24.674	3811.7		105			
106	21'-8			6"									20'-8		20		220			19	25.010	3909.1		106			
107	22'-0			8"									21'-0		20		220			19	25.346	3934.1		107			
108	22'-4			10"									21'-4		20		220			19	25.682	3959.1		108			
109	22'-8			6"									21'-8		21		228			20	26.018	4056.5		109			
110	23'-0			8"									22'-0		21		228			20	26.354	4081.5		110			
111	23'-4			10"									22'-4		21		228			20	26.690	4106.5		111			
112	23'-8			6"									22'-8		22		236			21	27.026	4203.9		112			
113	24'-0			8"									23'-0		22		236			21	27.362	4228.9		113			
114	24'-4			10"									23'-4		22		236			21	27.698	4253.9		114			
115	24'-8			6"									23'-8		23		244			22	28.034	4351.3		115			
116	25'-0			8"									24'-0		23		244			22	28.370	4376.3		116			
117	25'-4			10"									24'-4		23		244			22	28.706	4401.3		117			
118	25'-8			6"									24'-8		24		252			23	29.042	4498.7		118			
119	26'-0			8"									25'-0		24		252			23	29.378	4523.7		119			
120	26'-4			10"									25'-4		24		252			23	29.714	4548.7		120			
121	26'-8			6"									25'-8		25		260			24	30.050	4646.1		121			
122	27'-0			8"									26'-0		25		260			24	30.386	4671.1		122			
123	27'-4			10"									26'-4		25		260			24	30.722	4696.1		123			
124	27'-8			6"									26'-8		26		268			25	31.058	4793.5		124			
125	28'-0			8"									27'-0		26		268			25	31.394	4818.5		125			
126	28'-4			10"									27'-4		26		268			25	31.730	4843.5		126			
127	28'-8	▼	▼	6"	▼	▼	▼	▼	▼	▼	▼	▼	27'-8		27		276	▼	▼	26	32.066	4940.9	▼	127			
128	29'-0	9'-0	10"	8"	72"	84"	2'-0	8'-8	12'-8	20	2'-0	36"	28'-0	72	27	8'-8	276	3'-6	8	26	32.402	4965.9	245	128			

TABLE "A"			
RCP		CMP	
DIA.	CU. YDS.	DIA.	CU. YDS.
48"	0.566	60"	0.606
54"	0.711	66"	0.733
60"	0.873	72"	0.873
66"	1.051	78"	1.024
72"	1.245	84"	1.188



SEE STD DWG DB 3A FOR MANHOLE OPENING DIMENSIONS.
SEE STD DWG DB 3B FOR NOTES.



REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

STANDARD DIVERSION
BOX WITH MANHOLE
COVER 48" TO 72" RCP
AND 60" TO 84" CMP

STD DWG
DB 3C

JAN.01.2005
DATE

JAN.01.2005
DATE

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED

DEPUTY DIRECTOR

STANDARD DRAWING TITLE

REMARKS

2005 STANDARD DRAWINGS

END OF DRAWING BOOK PART 2